

1. 1995/II/6

When the word 'box' is viewed under the microscope, which of the following can be seen?

- A. box B. pox C. xop D. xoq

2. 1996/II/2

Which of the following is a correct step for using the microscope?

- A. Use the coarse adjustment knob for focusing under high power.
B. Reduce the light intensity for observation under high power.
C. Close one eye when observing the specimen under the microscope.
D. Position the specimen to the centre of the field of view before changing to a higher magnification.

3. 1998/II/4

In preparing a slide of an onion epidermal peel for microscopic examination, iodine solution is added to the peel. What is the use of the iodine solution?

- A. To supply minerals to the cells.
B. To test for the presence of starch.
C. To prevent the cells from bursting.
D. To make certain cell structures more distinct.

4. 2001/II/2

A student examines the epidermis of a leaf under the microscope. In order to observe more cells within the field of view, he should

- A. increase the illumination of the slide.
B. stain the epidermis with iodine solution.
C. use an objective with a lower magnification.
D. reduce the distance between the slide and the objective.

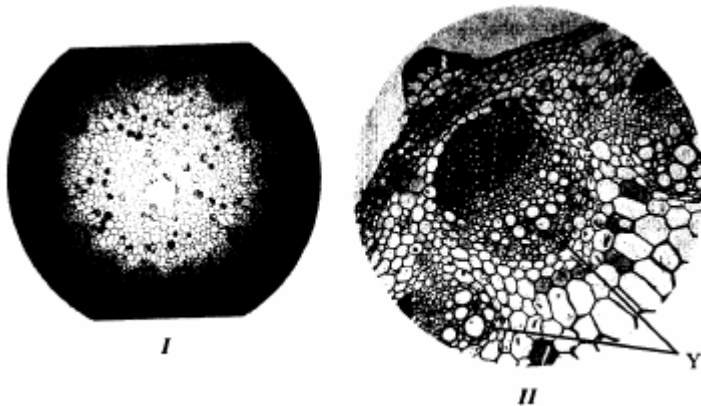
5. 2003/II/3

Which of the following correctly compares an epidermal cell and a mesophyll cell of a leaf?

- | Epidermal cell | Mesophyll cell |
|--------------------------|-----------------------|
| A. without nucleus | with nucleus |
| B. without cell wall | with cell wall |
| C. without chloroplasts | with chloroplast |
| D. without large vacuole | with large vacuole |

6. 2004/II/13

Questions 6 and 7 refer to the photomicrograph below, which show the cross section of a stem under different magnifications:



A student first focused on the section under the microscope and saw the section as shown in *I*. In order to see the section in *II*, the following steps are required. Arrange them in the correct sequence.

- (1) Turn the nosepiece for an objective of higher magnification
- (2) Turn the coarse adjustment knob / fine adjustment knob
- (3) Adjust the position of the section on the stage

A. (2),(1),(3) B. (2),(3),(1) C. (3),(1),(2) D. (3),(2),(1)

7. 2004/II/14

What is the function of cell type Y?

- A. to conduct sugar away from the leaves
- B. to maintain turgidity of the stem
- C. to transport mineral salts
- D. to store starch

8. 2006/II/39

Sir Robert Hooke is the first scientist who used the light microscope to observe cells. His study led to

- A. the discovery of virus
- B. the formulation of the cell theory
- C. the discovery of bacteria as a disease-causing agent
- D. the discovery of the fine structure of cell organelles

1. 1991/II/6

Which of the following cells possess chloroplasts?

- (1) a guard cell
- (2) a leaf mesophyll cell
- (3) an onion epidermal cell

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

2. 1993/II/7

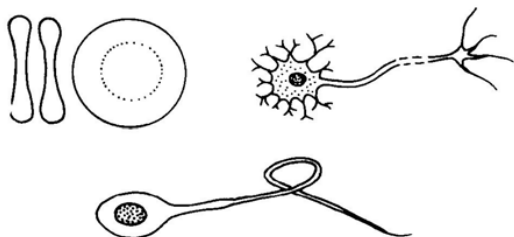
Which of the following descriptions of the different parts of a plant cell are correct?

- (1) The nucleus contains genetic materials
- (2) The vacuole contains water and dissolved mineral salts
- (3) The cell wall is selectively permeable to dissolved mineral salts

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

3. 1997/II/6

The diagrams below show three types of human cells :



All three types of cells

A. can move B. have a nucleus C. have a cell membrane D. can undergo cell division

4. 1999/II/23

All cells in a flowering plant have

A. a nucleus B. a cell membrane C. a cell wall D. chloroplasts

5. 2002/II/29

Which of the following statements about cellulose in plant cells is correct?

- A. It stores energy for the plant cells.
- B. It can be stained blue-black with iodine solution.
- C. It helps to maintain the shape of the plant cells.
- D. It regulates the movement of water in and out of the plant cells.

Enzymes can not work properly at high temperatures because

2. 1990/II/45

Metabolic process

End product

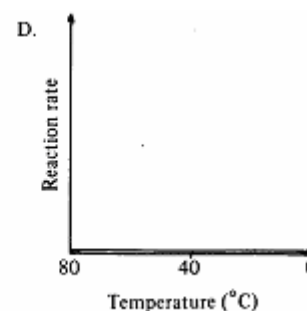
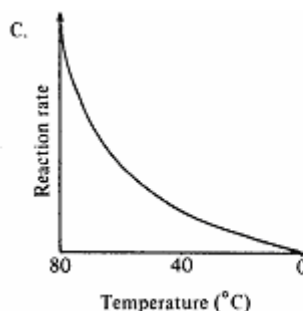
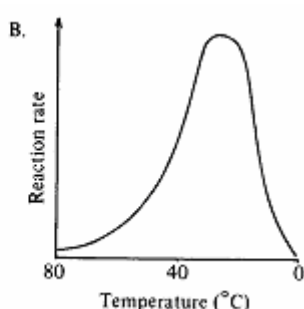
- ### 3. 1992/11/7

A.

Reaction rate

80 40 0

Temperature ($^{\circ}\text{C}$)



4. 1993/II/8

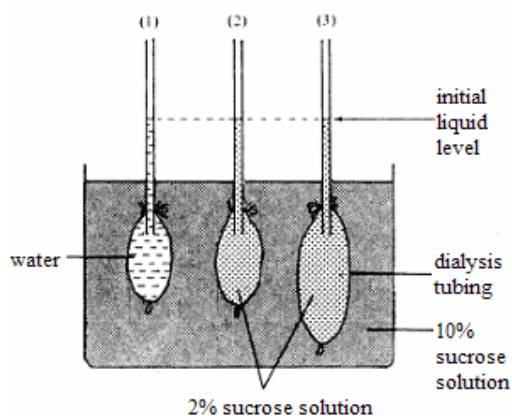
Solution	Percentage change in mass
I	+ 5%
II	- 5%
III	- 3%
IV	0%

Which of the following conclusions can be drawn?

- 4

5. 1993/II/10

Questions 5 and 6 refer to the experimental set-up shown below:

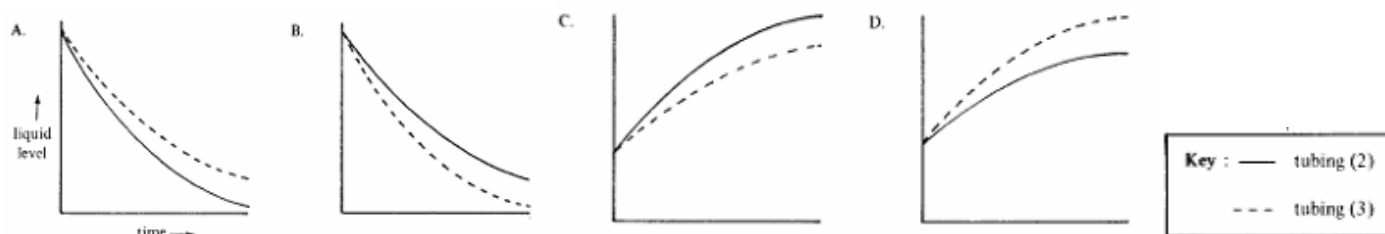


What will happen to the liquid levels in tubings (1) and (2) after one hour?

- | Tubing (1) | Tubing (2) |
|-------------------|-------------------|
| A. fall | fall |
| B. fall | rise |
| C. rise | rise |
| D. rise | fall |

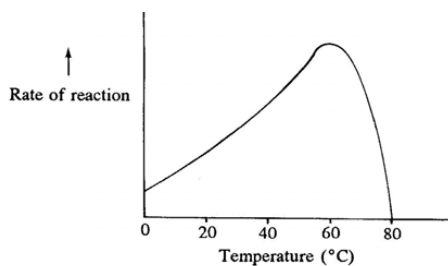
6. 1993/II/11

Which of the following graphs shows the likely changes in liquid level in tubings (2) and (3)?



7. 1994/II/50

The graph below shows the effect of temperature on the activity of salivary amylase:

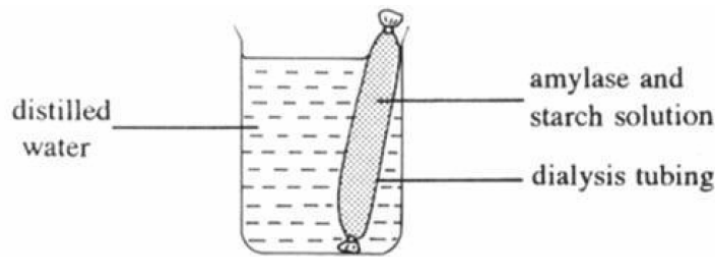


Which of the following statements concerning salivary amylase is correct?

- A. It is denatured at 0°C.
- B. Its activity increases steadily with a rise in temperature.
- C. It is most active at 60°C.
- D. It is killed at 80°C.

8. 1995/II/5

The diagram below a set-up to study the effect of amylase on starch. After 3 hours, water in the beaker was heated with Benedict's solution and a red precipitate appeared.

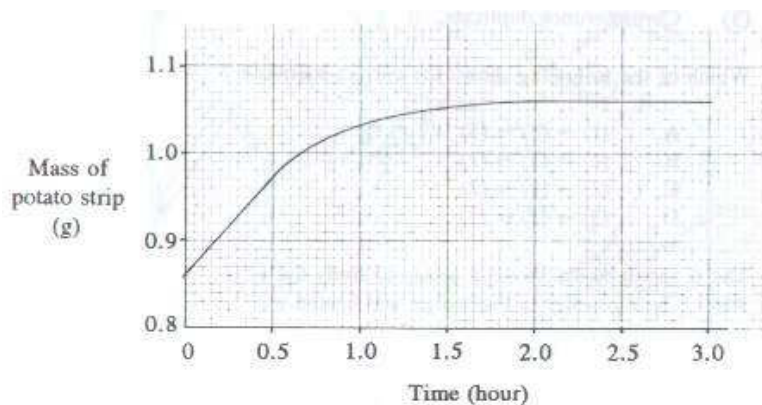


Which of the following can deduced from the above experiment?

- A. Glucose was form the digestion of starch.
- B. Starch could not pass though the dialysis tubing.
- C. The dialysis tubing allowed reducing sugar to pass through.
- D. The water potential of the solution in the dialysis tubing increased.

9. 1995/II/7

Question 9 and 10 refer to the graph below which shows the change in mass of a potato strip in distilled water at 20°C :



The rate of the osmosis is the highest between

- A. hour 0 and hour 0.5
- B. hour 0.5 and hour 1.0
- C. hour 1.0 and hour 1.5
- D. hour 1.5 and hour 2.0

10. 1995/II/8

Which of the following is a correct description of the potato cells between hour 2 and hour 3?

- A. The cells were turgid.
- B. The cell vacuole burst.
- C. The cell wall was impermeable to water.
- D. The cell membrane was fully permeable.

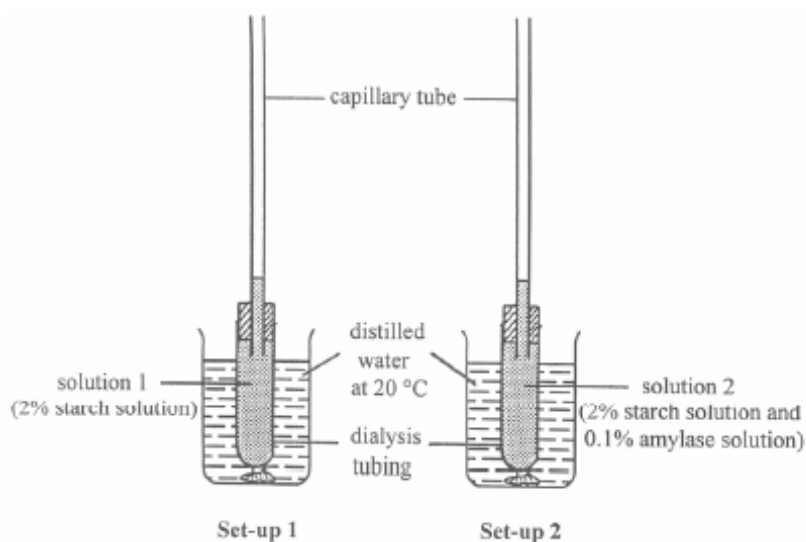
11. 1997/II/3

Which of the following processes is carried out by osmosis?

- A. The upward transport of water in the xylem.
- B. The reabsorption of glucose in the kidney tubules.
- C. The return of tissue fluid into the blood capillaries.
- D. The uptake of mineral salts from the soil into the root.

12. 1999/II/8

Questions 12 and 13 refer to the diagram below, which shows the initial condition of two set-ups :



After 1 hour, the liquid level in the capillary tube of set-up 2 is much higher than that of set-up 1. Which of the following is a probable reason for this result?

- A. Solution 1 has a lower water potential than solution 2.
- B. The dialysis tubing of set-up 1 is less permeable to water than that of set-up 2.
- C. Sugar is produced in solution 2.
- D. Less starch is present in solution 2.

13. 1999/II/9

Which of the following treatments might increase the rate of rise of the liquid level in set-up 2?

- (1) using a narrower dialysis tubing
- (2) using a capillary tube with a smaller internal diameter
- (3) raising the temperature of the distilled water from 20°C to 30°C

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

14. 2000/II/11

The table below shows the body mass of four mammals and their rate of oxygen consumption per unit body mass :

Mammal	Body mass (g)	Rate of oxygen consumption per unit body mass ($\text{mm}^3 \text{h}^{-1} \text{g}^{-1}$)
Mouse	25	1 580
Rabbit	2 200	466
Man	70 000	106
Elephant	3 800 000	67

What can be concluded from the above data ?

- A. Smaller mammals have a faster heart beat.
- B. Smaller mammals have a higher metabolic rate.
- C. Smaller mammals have a higher body temperature.
- D. Smaller mammals have a more efficient breathing system.

15. 2001/II/4

Which of the following statements about enzymes is correct?

- A. Enzymes are made up of proteins or fats.
- B. Enzymes are denatured at 0°C .
- C. The optimum temperature of most enzymatic activities is 37°C .
- D. The activity of most enzymes is low at 80°C .

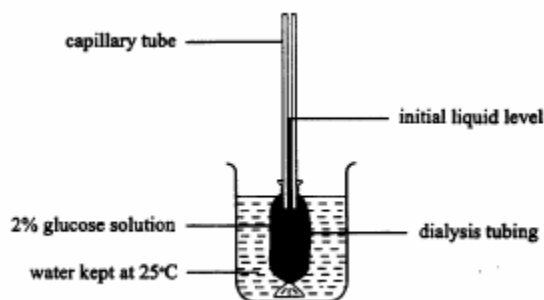
16. 2004/II/3

A student defines osmosis as “ the movement of water molecules from a dilute solution to a concentrated solution across a selectively permeable membrane.” This definition is inaccurate because

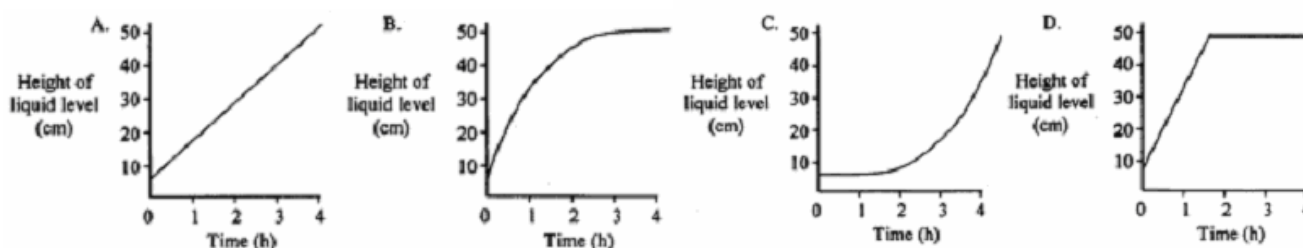
- A. solute molecules can also move along the concentration gradient.
- B. water molecules can also move from the concentrated solution to the dilute solution.
- C. it should state clearly that the membrane is not permeable to the solute molecules.
- D. movement of water molecules can still occur without a selectively permeable membrane.

17. 2004/II/15

Questions 17 and 18 refer to the diagram below, which shows a set-up used by Eric to study osmosis:



If Eric carries out the investigation for four hours, what would be the change in the liquid level in the capillary tube with time?



18. 2004/II/16

Which of the following can increase the rate of rise of the liquid level in the capillary tube?

- (1) Raise the water temperature to 30°C
- (2) Use a larger beaker with more water inside
- (3) Use a capillary tube with a smaller internal diameter

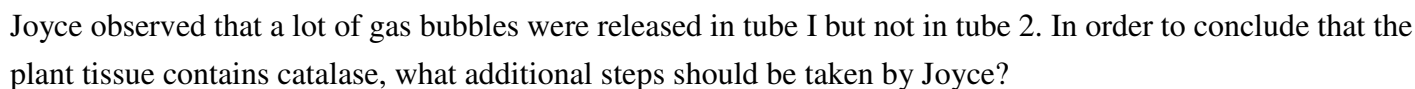
A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

19. 2004/II/19

Which of the following processes does not require metabolic energy?

- A. movement of the ovum in the oviduct.
- B. movement of undigested food along the colon.
- C. movement of oxygen from the air sacs of the lung into the blood.
- D. movement of amino acids from the glomerular filtrate to blood capillaries.

Questions 20 and 21 refer to an investigation on the enzyme catalase, which breaks down hydrogen peroxide and release oxygen. In order to show whether a certain plant tissue contains catalase or not, Joyce set up the following experiment :



- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

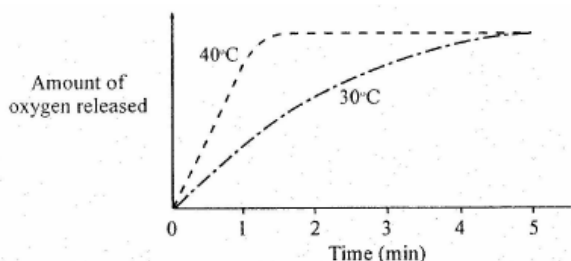
When gas bubbles stopped coming out from tube I, Joyce added more hydrogen peroxide into the tube. She observed that gas bubbles were produced again. What can be implied from this observation about the property of enzymes?

- A. Enzymes can be reused.
- B. Enzymes are specific in action.
- C. Enzymes are made up of proteins.
- D. Enzymes can speed up chemical reactions.

22. 2005/II/1

Questions 22 to 24 refer to the following experiments:

Two test tubes containing 5 cm^3 of hydrogen peroxide solution and 1 cm^3 of catalase solution respectively were kept at 30°C for 30 minutes. The contents of the two tubes were then mixed and maintained at the same temperature, and the amount of oxygen released was recorded for 5 minutes. The same experiment was repeated at 40°C . The results are shown below:



The initial rate of oxygen production at 40°C is higher than that at 30°C because

- A. catalase is denatured at the lower temperature.
- B. oxygen is less soluble at the higher temperature.
- C. more active sites are present in the enzyme molecules at the higher temperature.
- D. the substrate molecules have more kinetic energy at the higher temperature.

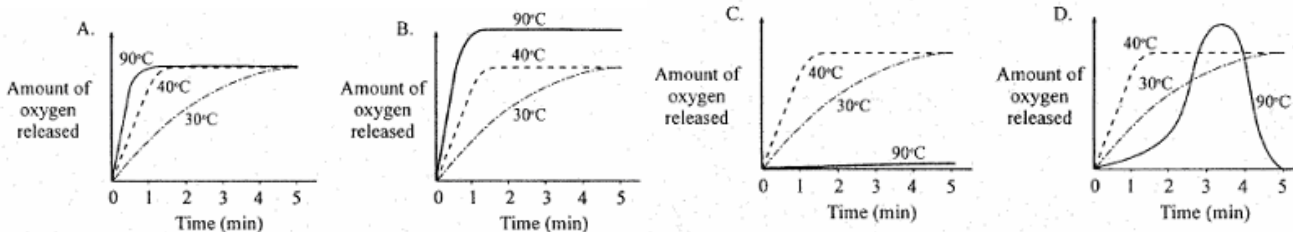
23. 2005/II/2

Which of the following is a correct interpretation of the graph?

- A. At 30°C , the rate of reaction was higher at the 5th minute.
- B. At both temperatures, the amount of oxygen released in 5 minutes was the same.
- C. At both temperatures, the time for the decomposition of all hydrogen peroxide was the same.
- D. All active sites of enzymes were occupied at the end of the experiment.

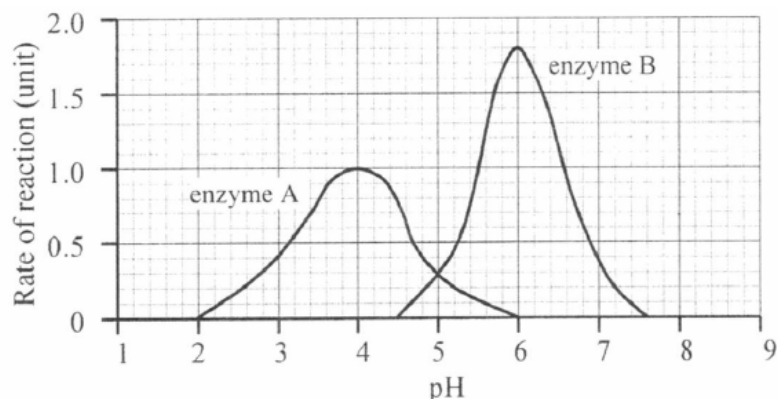
24. 2005/II/3

A third experiment was carried out as before but the contents were kept at 90°C . Which of the following would best indicate the result of the experiment?



25. 2006/II/23

Questions 25 to 27 refer to the graph below, which shows the rates of reactions catalysed by two enzymes A and B over a range of pH values:



The rates of the reactions catalysed by enzymes A and B are equal at

- A. pH 4 B. pH 5 C. pH 6 D. pH 7.5

26. 2006/II/24

Which of the following is a correct interpretation of the graph?

- A. Enzyme A is found in gastric juice.
B. Enzyme B is more active than enzyme A.
C. The optimum pH value for enzyme B is 1.8.
D. Enzyme A is more active than enzyme B at pH 4.

27. 2006/II/25

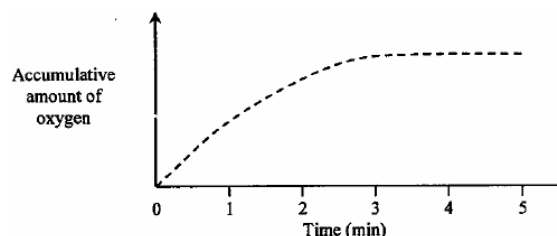
In the above study, it is important to keep the temperature at which the reactions occur constant because

- A. temperature affects enzyme activity.
B. the enzyme becomes inactive at low temperatures.
C. the enzyme becomes denatured at low temperatures.
D. temperature should be the same for control experiments.

28. 2007/II/7

Questions 28 and 29 refer to the following experiment :

Two boiling tubes containing 5 cm^3 of hydrogen peroxide solution and 1 cm^3 of catalase solution respectively were kept at 25°C for 10 minutes. The contents of the two tubes were then mixed and maintained at the same temperature, and the amount of oxygen released was recorded for 5 minutes. The results are shown below:

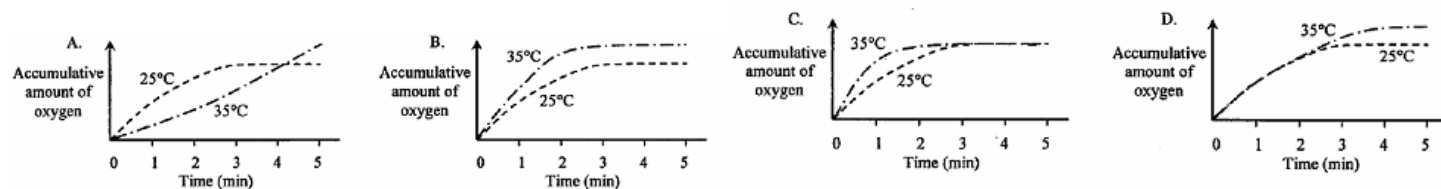


The line level off at the 3rd minute. Which of the following is a correct explanation for this?

- A. The reaction stops at the 3rd minute because catalase has been used up.
- B. The reaction stops at the 3rd minute because hydrogen peroxide has been used up.
- C. The reaction rate reaches the maximum at the 3rd minute because the amount of oxygen released is highest.
- D. The reaction rate reaches the maximum at the 3rd minute because there is no more increase in the amount of oxygen released.

29. 2007/II/8

The same experiment was repeated but the contents were kept at 35°C . Which of the following would best indicate the result of the experiment?



30. 2008/II/13

Questions 30 and 31 refer to an experiment about osmosis. Three strips of the same size were cut from a fresh potato and immersed into sucrose solutions of different concentration for four hours. The experiment was repeated using a potato that has already been stored for a certain period of time. The results obtained are shown in the table below:

Concentration of sucrose solution (%)	Percentage change in mass of the strips	
	Fresh potato	Stored potato
0	+20.0	+25.0
5	+6.0	+10.0
10	-7.0	-2.0

The dependent variable in the experiment is measured as the percentage changes in mass of potato strips because

- A. the final masses of the potato strips are different.
- B. the initial masses of the potato strips are different.
- C. there is a significant change in the mass of the photo strips.
- D. the mass can be measured accurately by using an electronic balance.

31. 2008/II/14

Which of the following about the interpretation of the results is correct?

Water potential of potato

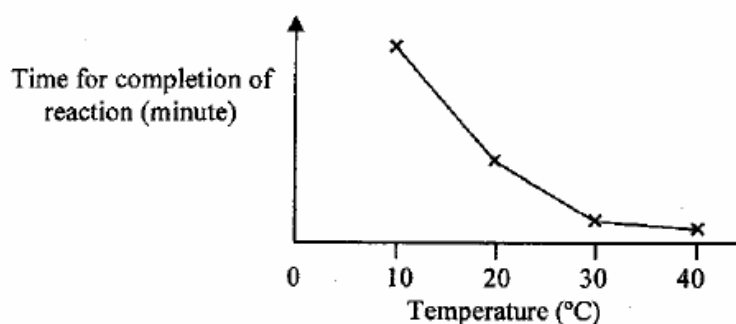
after storage

Explanation

- | | |
|--------------|---|
| A. decreases | some starch is converted to sugars during storage |
| B. decreases | some starch is used for growing during storage |
| C. increases | water is lost through evaporation during storage |
| D. increases | the permeability of cell membrane increases during exercise |

32. 2008/II/35

Questions 32 and 33 refer to the graph below, which shows the results of an investigation of an enzyme reaction performed by a group of students.



Which of the following is the correct explanation of the above results?

- A. More enzymes can be reused as the temperature increases.
- B. Enzyme is made up of proteins, it is denatured as the temperature increases.
- C. Enzyme collides with substrate more frequently as the temperature increases.
- D. Enzyme is inactive at low temperature and therefore there is no reaction at 0°C.

33. 2008/II/36

After the investigation, one of the students concluded that the optimum temperature of this enzyme is 40°C. However, another student disagreed with this conclusion. We can verify whether the conclusion is correct by repeating the experiment

- A. several times.
- B. with a wide range of temperature.
- C. with a smaller interval of temperature.
- D. with a greater amount of enzyme and substrate.

1. 1990/II/1

Which of the following plants does both bear flowers but reproduces by seeds?

- A. pine B. fern C. grass D. broad bean

2. 1991/II/1

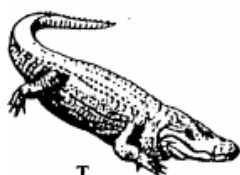
Questions 2 to 4 refer to the drawings below which show a variety of animals:



R



S



T



U



V



W

Which of the following pairs of animals is correctly classified?

- | Animals | Major Group |
|----------------|--------------------|
| A. R and W | mammals |
| B. S and V | amphibians |
| C. T and V | reptiles |
| D. U and W | birds |

3. 1991/II/2

Which of the following is a correct matching?

- | Animal | Characteristic Feature |
|---------------|-------------------------------|
| A. T | slimy scales |
| B. U | webbed feet |
| C. V | moist skin |
| D. W | feathers |

4. 1991/II/3

Which of the following pairs of animals carries out external fertilization?

- A. S and T B. S and V C. T and U D. U and V

5. 1991/II/4

The table below compares three different plants:

Plant (1)	Plant (2)	Plant (3)
no chlorophyll	with chlorophyll	with chlorophyll
no seeds	no seeds	with seeds
no flowers	no flowers	no flowers

Which of the following combinations is correct?

- | Plant (1) | Plant (2) | Plant (3) |
|-----------|-----------|-------------|
| A. fungi | algae | gymnosperms |
| B. fungi | algae | ferns |
| C. algae | fungi | gymnosperms |
| D. algae | fungi | ferns |

6. 1992/II/6

Which of the following are true for fungi?

- (1) They possess cell wall
 (2) They have roots and stems
 (3) They do not possess chlorophyll
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

7. 1993/II/1

Questions 7 and 8 refer to the table below which shows some features of four plants:

Plant	Features		
	Flowers	Seeds	Chlorophyll
I	+	+	+
II	—	—	—
III	—	—	+
IV	—	+	+

Key : + present

— absent

Which of the following plants possess the same feature as Plant I?

- A. pine B. grass C. mushroom D. bread mould

8. 1993/II/2

Which of the plants is correctly classified?

	Plant	Major Group		Plant	Major Group
A.	I	ferns	B.	II	algae
C.	III	mosses	D.	IV	gymnosperms

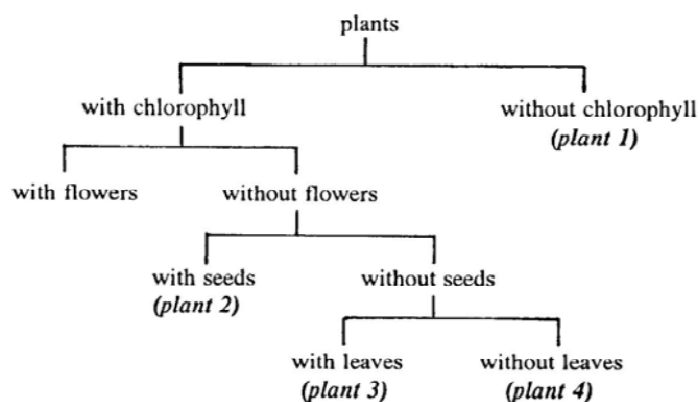
9. 1994/II/1

Goldfish, turtles and snakes are all classified as vertebrates because

- (1) they have scales.
 (2) they have backbones.
 (3) they are cold-blooded.
- A. (1) only B. (2) only C. (1) and (2) only D. (1), (2) and (3)

10. 1994/II/2

The figure below describes some features of four different plants:

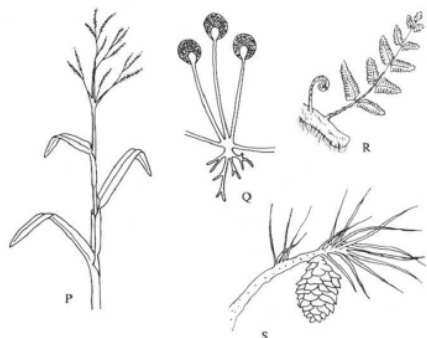


Which of the following correctly classifies the four plants?

	Plant 1	Plant 2	Plant 3	Plant 4
A.	flowering plant	gymnosperm	fern	moss
B.	fungus	fern	gymnosperm	moss
C.	fern	moss	alga	gymnosperm
D.	fungus	gymnosperm	fern	alga

11. 1995/II/1

Question 11 and 12 refer to the diagrams below which show four different plants :



Which plant is correctly classified ?

Plant	Major group	Plant	Major group
A. P	non-flowering plants	B. Q	algae
C. R	ferns	D. S	flowering plants

12. 1995/II/2

Which of the following statement is incorrect?

- A. P produces seeds B. Q has chlorophyll C. R produces spores D. S has needle-shaped

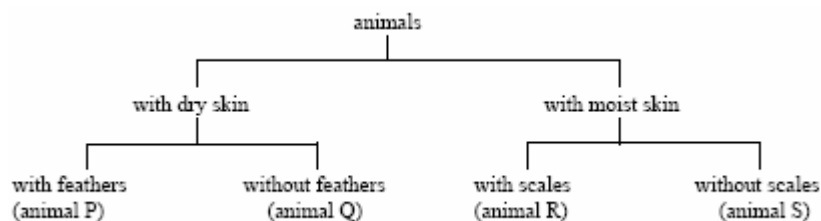
13. 1995/II/3

Which of the following features is common to frogs, lizards and birds?

- A. They have backbones. B. They are warm-blooded.
C. They have scales on their bodies. D. They have claws on their limbs.

14. 1996/II/1

The chart below describes some features of four different animals:



These four animals could be

	animal P	animal Q	animal R	animal S
A.	pigeon	goldfish	snake	frog
B.	pigeon	snake	goldfish	frog
C.	snake	frog	goldfish	pigeon
D.	snake	goldfish	frog	pigeon

15. 1997/II/1

The dichotomous key below lists some features of four plants P, Q, R and S :

- 1a with flowers.....P
 1b without flowers.....2
 2a with seeds.....Q
 2b without seeds.....3
 3a with chlorophyll.....R
 3b without chlorophyll.....S

Which of the four plants is an alga?

- A. P B. Q C. R D. S

16. 1997/II/2

Which of the following are correct descriptions of the plant shown in the diagram below?



- (1) It produces spores.
 (2) It has roots and stems.
 (3) It forms fruits.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

17. 1998/II/1

Questions 17 and 18 refer to the table below to which shows some features of four different plants :

Plant	Chlorophyll	Root	Leaf	Seed
P	+	—	—	—
Q	—	—	—	—
R	+	+	+	+
S	+	+	+	+

Key : + = present
 — = absent

Which of the following correctly classifies plants P and Q ?

Plant P Plant Q

- A. alga moss
 B. alga fungus
 C. fern moss
 D. fern fungus

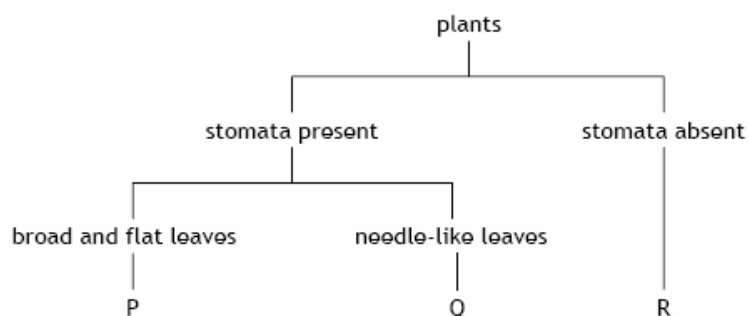
18. 1998/II/2

Although plant R and plant S show the same features in the above table, they belong to different plant groups. Which of the following features should be examined in order to identify the plant groups to which they belong?

- A. the shape of leaves B. the way of pollination
C. the presence of flowers D. the method of seed dispersal

19. 1998/II/11

The figure below describes some features of three flowering plants P, Q and R :



Which of the following correctly describes the habitats of the three plants?

- | P | Q | R |
|-------------------------|----------------------|--------------------|
| A. tropical rain forest | desert | submerged in water |
| B. submerged in water | desert | grassland |
| C. tropical rain forest | grassland | desert |
| D. grassland | tropical rain forest | submerged in water |

20. 1999/II/1

Which of the following animals have scales covering the skin?



(1)



(2)



(3)



(4)

- A. (1) and (4) only B. (2) and (3) only C. (1), (2) and (3) only D. (1), (2), (3) and (4)

21. 1999/II/2

The dichotomous key below lists some features of four different plants P, Q, R and S :

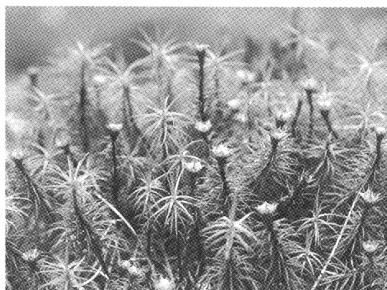
- 1a with flowers..... P
- 1b without flowers..... 2
- 2a with seeds..... Q
- 2b without seeds..... 3
- 3a with roots..... R
- 3b without roots..... S

Which of the four plants is a gymnosperm?

- A. P B. Q C. R D. S

22. 1999/II/3

Which of the following correctly describes the plant in the diagram below?

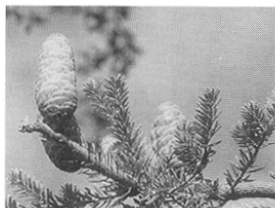
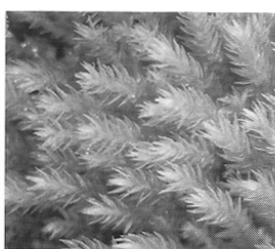


(Magnification x3)

- A. no true roots present
- B. using seeds for dispersal
- C. commonly found on dry soil
- D. capable of producing pollen grains

23. 2000/II/1

Questions 23 and 24 refer to the photographs below, which show four different plants :

W (Magnification $\times \frac{1}{3}$)X (Magnification $\times \frac{1}{4}$)Y (Magnification $\times \frac{1}{10}$)Z (Magnification $\times 3$)

Which plant can only survive in a moist and shady environment?

- A. W B. X C. Y D. Z

24. 2000/II/2

Which plants are capable of producing seeds ?

- A. W and X only B. Y and Z only C. W, X and Y only D. X, Y and Z only

25. 2000/II/3

The table below lists some features of three animals :

	Animal		
	P	Q	R
Vertebral column	✗	✓	✓
Scales	✗	✓	✗
Hair	✗	✗	✓

Key : ✓ = present ; ✗ = absent

The three animals could be

- | | P | Q | R |
|----|-----------|----------|----------|
| A. | jellyfish | snake | rabbit |
| B. | jellyfish | starfish | chicken |
| C. | goldfish | rabbit | bat |
| D. | goldfish | turtle | horse |

26. 2001/II/1

Which of the following animals lays eggs with a hard shell?

- A. toad B. snake C. whale D. goldfish

27. 2002/II/1

Scientists classify organisms into groups on the assumption that closely related organisms

- A. are found in similar habitats. B. have similar behavior.
C. have similar structures. D. have similar diets.

28. 2002/II/2

Which of the following statements about plants is/are correct?

- (1) Flowering plants can produce seeds
(2) Non-flowering plants cannot produce fruit
(3) Flowering plants cannot reproduce asexually
A. (1) only B. (1) and (2) only C. (1) and (3) only D. (2) and (3) only

29. 2003/II/1

A student examined four plants, P, Q, R and S, in the field. He constructed the dichotomous key below to identify these plants:

- 1a with leaves.....2
1b without leaves.....P
2a with cones.....Q
2b without cones.....3
3a with pollens.....R
3b without pollens.....S

One of them is potato plant.

Which one is it?

- A. P B. Q C. R D. S

30. 2004/II/58

Which of the following plants does not bear flowers but produces by seeds?

- A. fern B. grass C. a pine tree D. an onion plant

31. 2006/II/3

Questions 31 and 32 refer to the key below, which is used for classifying some groups of organisms :

- | | | |
|-----|--------------------------|-----------|
| (1) | Presence of protein coat | W |
| | Absence of protein coat | Go to (2) |
| (2) | Presence of mitochondria | Go to (3) |
| | Absence of mitochondria | X |
| (3) | Presence of chloroplasts | Y |
| | Absence of chloroplasts | Z |

Which of the following combinations correctly matches the descriptions given in the key?

- | | | | |
|----|------------|------------|----------|
| | W | X | Z |
| A. | prokaryote | fungus | animal |
| B. | virus | protoctist | fungus |
| C. | virus | prokaryote | animal |
| D. | prokaryote | protoctist | fungus |

32. 2006/II/4

Which of the following structures may be possessed by organisms in group Y?

- (1) seed
(2) cone
(3) spore
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

33. 2006/II/5

The table below lists some features of three organisms, P, Q and R:

	Features		
	Chlorophyll	Fruits	Cell wall
P	✗	✗	✓
Q	✓	✗	✓
R	✓	✓	✓

Which of the following correctly matches the identity of the three organisms?

- | | | | |
|----|-----------|----------|----------|
| | P | Q | R |
| A. | bacterium | pine | grass |
| B. | fungus | rose | fern |
| C. | moss | fern | rose |
| D. | snail | grass | pine |

34. 2007/II/6

Which of the following features is common to dogs, ducks and dolphins?

- A. They breathe with lungs. B. They have claws on their limbs.
C. They possess mammary glands. D. They have hairs on their bodies.

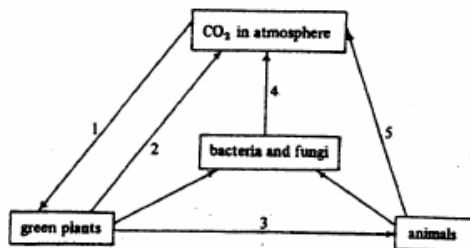
1. 1990/II/33

Addition of ammonium salts to the soil may lead to an increase in its nitrate content. This is due to the action of

- A. the putrefying bacteria B. the nitrifying bacteria
C. the denitrifying bacteria D. the nitrogen-fixing bacteria

2. 1990/II/58

Questions 2 and 3 refer to the simplified carbon cycle shown below:



Oxygen is consumed in processes

- A. (1),(2) and (3) B. (1),(3) and (4) C. (2),(3) and (5) D. (2),(4) and (5)

3. 1990/II/59

In the cycle shown above, bacteria and fungi are

- A. consumers B. decomposers C. parasites D. producers

4. 1991/II/9

Which of the following organisms occupies the lowest tropic level in a food chain?

- A. carnivores B. herbivores C. omnivores D. producers

5. 1991/II/39

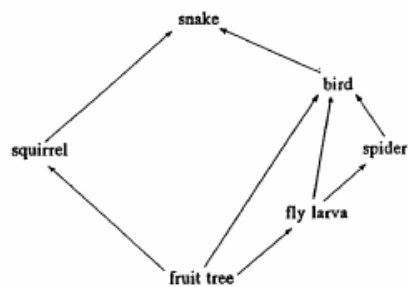
Which of the following occur in an ecosystem?

- (1) cycling of energy
(2) cycling of materials
(3) interaction among organisms
(4) interaction between organism and the environment

- A. (1) and (3) only B. (2) and (4) only C. (2), (3) and (4) only D. (1),(2),(3) and (4)

6. 1991/II/49

Questions 6 and 7 refer to the diagram below which shows a food web found in a woodland:



Which of the following are carnivorous?

- A. spiders and birds B. spiders and snakes C. snakes and fly larvae D. squirrels and fly larvae

7. 1991/II/50

Which of the following correctly describes the relationship between birds and spiders?

- A. competition
B. predation and mutualism
C. competition and mutualism
D. predation and competition

8. 1991/II/51

Plants and animals living together in a certain area form

- A. a habitat B. a community C. a population D. an ecosystem

9. 1991/II/54

Red tides may be caused by

- A. a rapid growth of bacteria on the water surface.
B. a sudden decrease in the oxygen content of the water.
C. a sudden increase in the nutrient content of the water.
D. a sudden increase in the turbidity of the water.

10. 1992/II/13

Which of the following combinations correctly matches the modes of nutrition of the organism shown below?

- (1) moulds
- (2) mosses
- (3) tapeworms
- (4) disease-causing bacteria

Autotrophic nutrition

Parasitic nutrition

Saprophytic nutrition

- | | | | |
|----|-----|-----|-----|
| A. | (2) | (4) | (1) |
| B. | (1) | (3) | (2) |
| C. | (1) | (4) | (3) |
| D. | (2) | (3) | (4) |

11. 1992/II/52

Which of the following does not show the true relationship between the organism?

Organisms concerned	Relationship
A. tapeworm and man	parasitism
B. birds and caterpillars	mutualism
C. algae and bacteria in lichen	mutualism
D. barnacles attached to crabs	commensalisms

12. 1992/II/53 (*This item was deleted*)

The table below shows the results of a soil analysis:

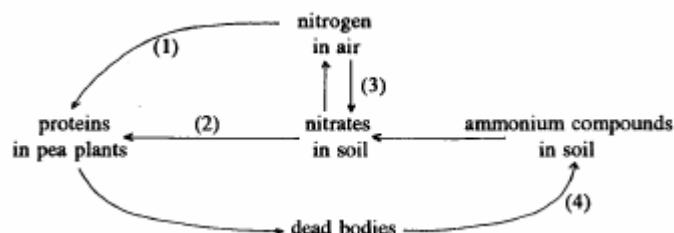
Weight of the original soil sample	50g
Weight after heating at 100 °C	40g
Weight after heating at 250 °C	30g

What is the percentage of humus in the soil sample?

- A. 15% B. 20% C. 25% D. 40%

13. 1992/II/54

Questions 13 and 14 refer to the diagram below which shows some of the pathways in the nitrogen cycle :



Which of the following represents nitrogen fixation?

- A. (1) B. (1) and (2) C. (1) and (3) D. (2) and (3)

14. 1992/II/55

The organism involved in process (4) are

- A. putrefying bacteria B. nitrifying bacteria
C. denitrifying bacteria D. nitrogen fixing bacteria

15. 1992/II/56

Why is it necessary to add nitrogenous fertilizers regularly to a vegetable field but not the natural grassland?

- A. Vegetable are harvested
B. Grass can make use of atmospheric nitrogen
C. Grass grows best in soils with low nitrogen content
D. Denitrifying bacteria are especially active in vegetable fields

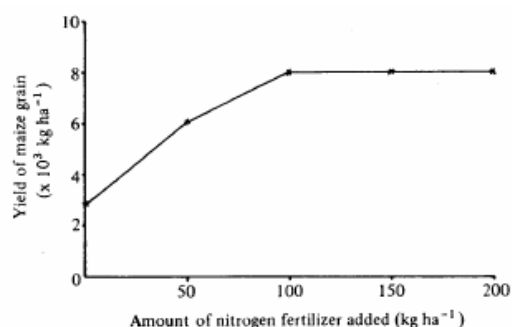
16. 1992/II/57

Compared with a sandy soil an equal volume of clay soil generally contains

- A. more air and more water B. more air and less water
C. less air and more water D. less air and less water

17. 1992/II/58

The graph below shows the yield of maize grain in relation to the amount of nitrogen fertilizer added to the soil



What conclusion can be drawn from the graph?

- A. There would be no yield of maize grain without the addition of nitrogen fertilizer
B. The yield of maize grain is directly proportional to the amount of nitrogen fertilizer added
C. It is not economical to add nitrogen fertilizer beyond 100 kg ha^{-1}
D. The addition of nitrogen fertilizer at a concentration of 200 kg ha^{-1} has a damaging effect on the environment

18. 1992/II/59

The amount of the carbon in the carbon cycle

- A. is increasing rapidly B. is decreasing rapidly
C. is increasing slowly D. remains fairly constant

19. 1993/II/40

Monoculture would lead to

- (1) a loss of species
(2) an increase in pest population
(3) destruction of natural habitats
A. (1) only B. (1) and (2) only C. (2) and (3) only D. (1),(2) and (3)

20. 1993/II/51

An oak woodland consists of the following organisms in each trophic level:

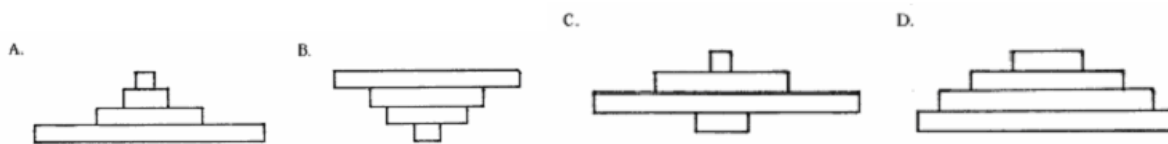
1st trophic level : oak tree

2nd trophic level: insects and spiders

3rd trophic level: snakes and lizards

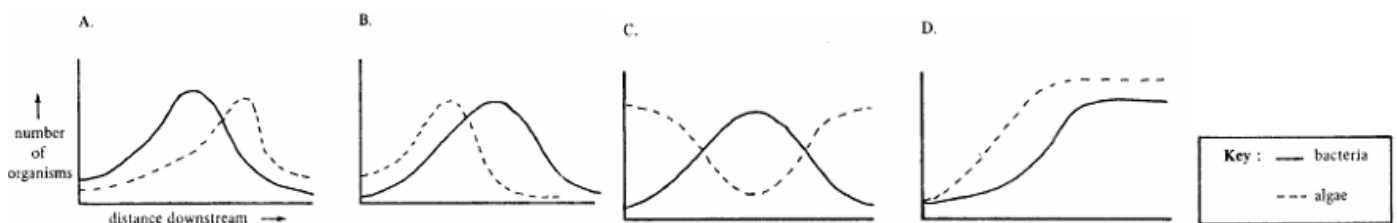
4th trophic level: birds

Which of the following shows the relative number of organisms in each trophic level in the woodland?



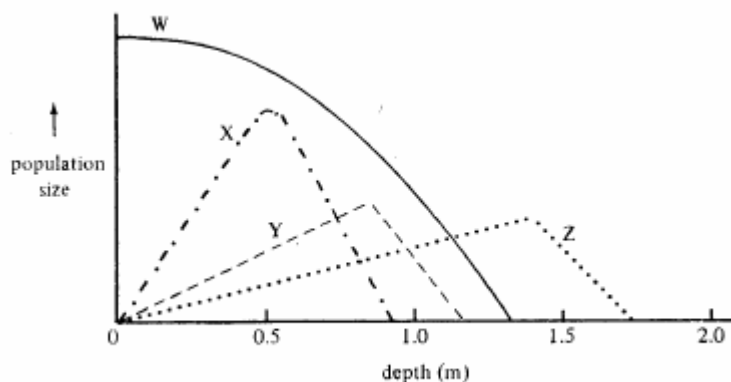
21. 1993/II/52

When a large amount of nitrogen fertilizer leaches into a stream, which of the following graphs shows the likely changes in the population of algae and bacteria along the stream?



22. 1993/II/53

Questions 22 and 23 refer to the graph below which shows the distribution of four kinds of green algae (W, X, Y and Z) at different depths of water in a pond :



Which plants is best adapted to the dim light conditions?

A. W B. X C. Y D. Z

23. 1993/II/54

The probable relationship between X and Y is

A. predation B. mutualism C. competition D. commensalisms

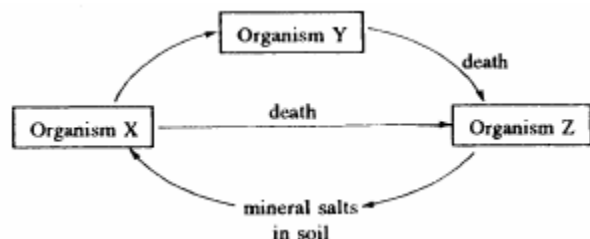
24. 1993/II/55

If nitrogen-fixing genes can be transferred from leguminous plants into other crop plants, this can

- A. reduce the use of the fertilizers.
- B. reduce the use of insecticides.
- C. increase the sugar content of the crop plants.
- D. increase the resistance of crop plants to fungal infections.

25. 1993/II/56

The following is a simplified diagram of a nutrient cycle



Which of the following correctly identifies the three groups of organisms?

- | X | Y | Z |
|----------------|-------------|-------------|
| A. decomposers | consumers | producers |
| B. consumers | decomposers | producers |
| C. producers | consumers | decomposers |
| D. producers | decomposers | consumers |

26. 1993/II/57

Which of the following events can increase the nitrate content of soil?

- (1) lightning
 - (2) cultivation of wheat
 - (3) addition of humus
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

27. 1994/II/11

Which of the following organisms are saprophytic?

- (1) the virus causing AIDS
 - (2) bacteria causing food decay
 - (3) fungi growing on the surface of bread
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

28. 1994/II/51

Three food chains in an aquatic ecosystem are shown below:

- (1) algae → large fish
- (2) algae → shrimps → large fish
- (3) algae → shrimps → small fish → large fish

Which of the following statements is correct?

- A. In food chain (3) the large fish are at the third trophic level.
- B. In food chain (3) the number of small fish is greater than that of the shrimps.
- C. If the three food chains have the same energy input, food chain (3) can support the largest number of large fish.
- D. Sunlight is the ultimate source of energy for all the food chains.

29. 1994/II/52

The diagram below indicates the relative number of organisms at three different trophic levels in a food chain:

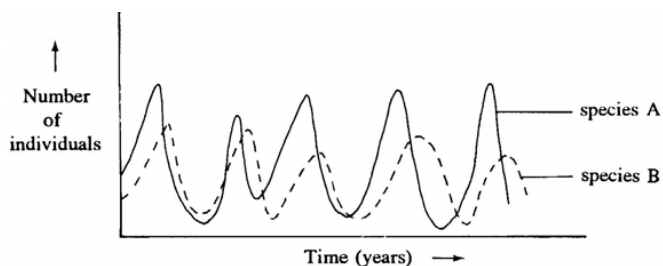


Which food chain can be represented by the above diagram?

- A. grass → grasshoppers → birds
- B. pond weed → fish → crabs
- C. grass → sheep → tapeworm
- D. tree → caterpillars → birds

30. 1994/II/53

The following graph shows the changes in the numbers of two species of organisms in the same habitat over a period of time:



The probable relationship between species A and species B is

- A. commensalisms.
- B. competition.
- C. mutualism.
- D. predation.

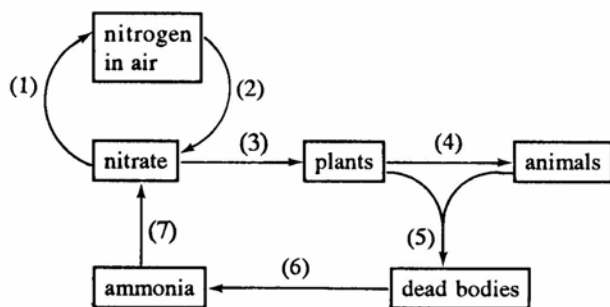
31. 1994/II/54

A continuous supply of energy is essential for the maintenance of a stable ecosystem because

- A. it provides a warm environment for the organisms to carry out their activities.
- B. energy is constantly lost to the surroundings through various activities of the organisms.
- C. animals need a lot of energy to maintain a high metabolic rate.
- D. animals are dependent on green plants for their food supply.

32. 1994/II/55

Questions 32 and 33 refer to the diagram below which shows a simplified nitrogen cycle:



Which of the following processes does not involve the action of microorganisms?

- A. (1) B. (3) C. (6) D. (7)

33. 1994/II/56

Which of the following processes would be promoted by growing soya bean?

- A. (1) B. (2) C. (4) D. (5)

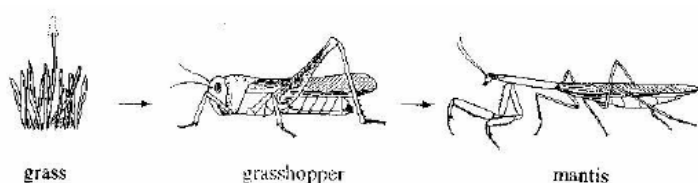
34. 1995/II/55

Which of the following pairs of organisms can gain benefits from each other in their association?

- A. rabbit and fox B. nitrogen-fixing bacteria and leguminous plant
C. tapeworm and man D. soil bacteria and fungi

35. 1995/II/56

Question 35 and 36 refer to the following food chain found in the grassland :



As energy is transferred from grass to grasshopper, energy is lost as a result of

- (1) respiration
(2) photosynthesis
(3) transpiration

- A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

36. 1995/II/57

The grasshopper and the mantis are green. This is an example of

- A. predation. B. competition. C. commensalisms D. protective coloration.

37. 1996/II/11

Which of the following features of the tapeworm helps it obtain food from the host?

- A. flattened body B. presence of hooks C. presence of suckers D. absence of digestive system

38. 1996/II/53

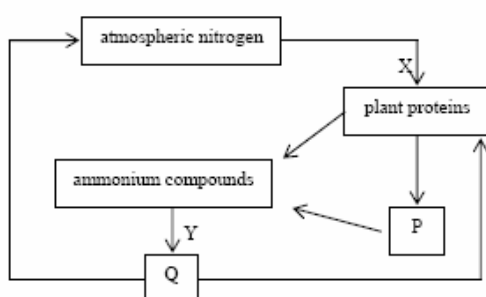
A lichen is a close association of an alga and a fungus which cannot survive independently.

This association is an example of

- A. competition B. commensalism C. mutualism D. parasitism

39. 1997/II/49

Questions 39 and 40 refer to the diagram below which shows a simplified nitrogen cycle:



What are P and Q?

P**Q**

- | | |
|--------------------|---------|
| A. animal proteins | nitrate |
| B. urea | nitrate |
| C. animal proteins | urea |
| D. nitrate | urea |

40. 1997/II/50

What are processes X and Y?

Process X**Process Y**

- | | |
|----------------------|-----------------|
| A. nitrification | putrefaction |
| B. putrefaction | denitrification |
| C. nitrogen fixation | denitrification |
| D. nitrogen fixation | nitrification |

41. 1997/II/52

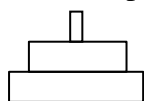
Three food chains are shown below:

- 1 : grass → cow → lion
- 2 : tree → beetle → parasite of beetle
- 3 : flowering plant → butterfly → bird

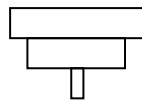
They can be represented by the three pyramids of number X, Y and Z below:



Pyramid X



Pyramid Y



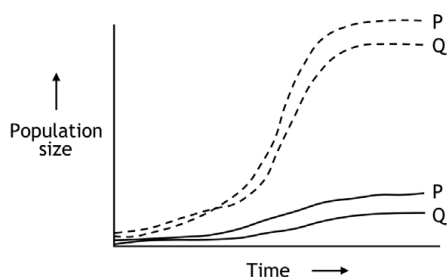
Pyramid Z

Which of the following combinations correctly matches the food chains and the pyramids?

	Pyramid X	Pyramid Y	Pyramid Z
A.	1	2	3
B.	2	1	3
C.	2	3	1
D.	3	1	2

42. 1998/II/55

Questions 42 and 43 refer to the graphs below which show the change in population size of two different species of microorganisms, P and Q, when they are grown under different conditions :



Key : - - - - the microorganisms are grown separately in two cultures
 ——— the microorganisms are grown together in the same culture

What is the ecological relationship between P and Q ?

- A. predation B. competition C. commensalisms D. mutualism

43. 1998/II/56

The population growth curves eventually level off when

- A. all the food in the culture medium is used up.
- B. all the microorganisms are killed by the accumulation of toxic substances.
- C. the rate of reproduction of the two species of microorganisms are the same.
- D. the rate of reproduction and the rate of death of each species of microorganisms are the same.

44. 1999/II/13

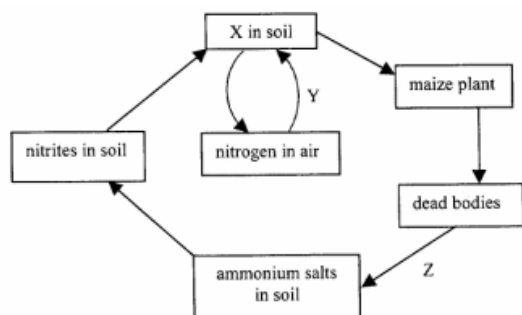
Which of the following statements about the organism shown in the photograph below is correct?



- A. It produces food by itself. B. It decomposes organic matter in the soil.
C. It has roots to absorb nutrients in the soil. D. It fixes atmospheric nitrogen into nitrates.

45. 1999/II/56

Questions 45 to 47 refer to the diagram below, which shows some stages of the nitrogen cycle in a maize field :



Which of the following substances in the maize plants is/are formed from compound X?

- (1) fat
(2) starch
(3) protein
A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

46. 1999/II/57

Process Y will be promoted by

- A. putrefying bacteria. B. nitrifying bacteria.
C. nitrogen-fixing bacteria. D. root cells of maize plants.

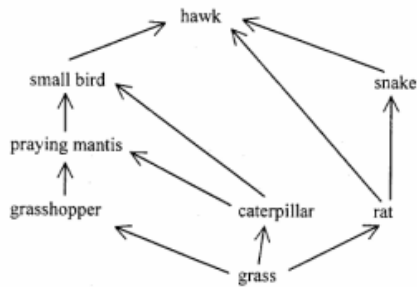
47. 1999/II/58

Which of the following conditions will favour process Z?

- A. well-aerated soil B. low soil temperature
C. soil flooded with water D. addition of chemical fertilizers

48. 1999/II/59

Questions 48 and 49 refer to the following food web:



Which of the following animals are tertiary consumers?

- | | |
|-------------------------------------|--|
| A. small bird and hawk | B. praying mantis and snake |
| C. grasshopper, caterpillar and rat | D. praying mantis, small bird and hawk |

49. 1999/II/60

What is the relationship between hawk and snake?

- | | |
|--------------------------------|--------------------------------|
| A. competition and predation | B. competition and mutualism |
| C. predation and commensalisms | D. commensalisms and mutualism |

50. 2000/II/43

The photograph below shows some egrets standing on the back of buffaloes:

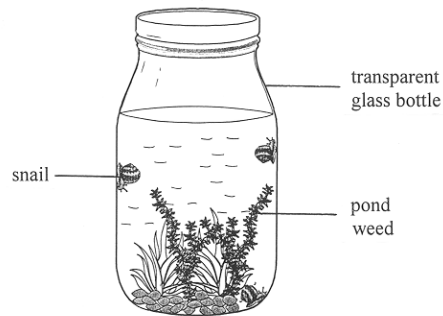


The egrets feed on insects in the grass, which the buffaloes disturb as they move around in the grass. The association between the egret and the buffalo is an example of

- A. predation. B. parasitism. C. competition. D. commensalism.

51. 2000/II/45

Questions 51 and 52 refer to the diagram below, which shows a glass bottle containing some pond weeds and snails. Under suitable conditions, the organisms inside the bottle can live for many years.



To keep the organisms alive, the bottle needs a constant supply of

- A. light. B. water. C. oxygen. D. carbon dioxide.

52. 2000/II/46

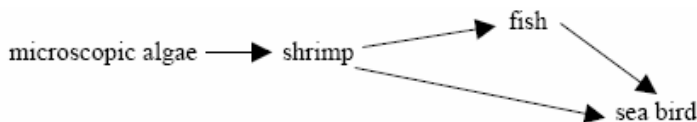
Which of the following must be present in this ecosystem?

- (1) nitrogen-fixing bacteria
- (2) putrefying bacteria
- (3) nitrifying bacteria

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

53. 2000/II/52

Questions 53 and 54 refer to the diagram below, which shows a food web in the sea :



Which organism(s) is/are the secondary consumer?

- A. shrimp only B. sea bird only C. shrimp and fish only D. fish and sea bird only

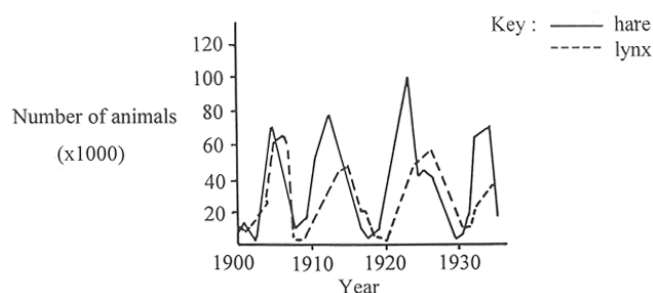
54. 2000/II/53

If the seawater contains a trace amount of DDT (a pesticide), which organism may have the highest concentration of DDT in its body ?

- A. microscopic algae B. shrimp C. fish D. sea bird

55. 2000/II/56

Questions 55 and 57 refer to the graph below, which shows the cyclic changes in the populations of two animals, hare and lynx, in a certain area over a number of years :



The pattern of changes in the populations of the two animals suggests that

- A. the hare is the prey of the lynx.
- B. the hare and the lynx have the same life span.
- C. the hare feeds on plants and the lynx feeds on animals.
- D. the population of the hare is always greater than that of the lynx.

56. 2000/II/57

In the same cycle, the peak of the lynx population is always lower than that of the hare population.

This is because

- A. hunting reduces the population of the lynx.
- B. the hare has fewer predators than the lynx.
- C. the hare has more food supply than the lynx.
- D. the hare competes more successfully with the lynx for food.

57. 2000/II/58

Which of the following correctly describe the nutrition of bread mould and that of tapeworm?

- (1) Both cannot make organic food.
 - (2) Both need to carry out external digestion.
 - (3) Both can absorb digested food substances from the surroundings.
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

58. 2001/II/8

Which of the following is an example of mutualism?

- A. barnacles fixed on the body of crabs.
- B. AIDS virus living in the human body.
- C. mould growing on the surface of oranges.
- D. nitrogen-fixing bacteria living in leguminous plants.

59. 2001/II/38

Which of the following can be recycled in an ecosystem by decomposers?

- (1) carbon
- (2) energy
- (3) nitrogen

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

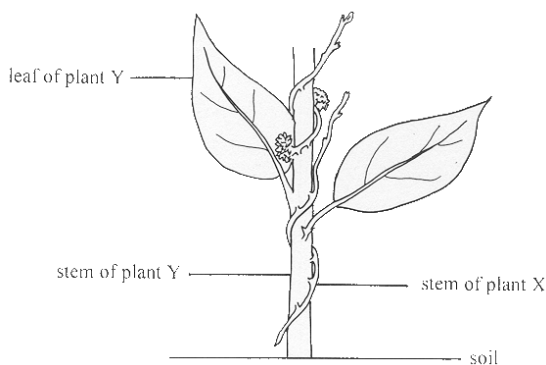
60. 2001/II/41

The soil nitrogen content of farmland can be improved by growing

A. rice B. grapes C. peanuts D. potatoes

61. 2001/II/47

Questions 61 and 62 refer to the diagram below, which shows a plant X growing on another plant Y :



Plant X has a white thread-like stem. When mature, it has no leaves or roots, and it obtains organic nutrients from plant Y. Plant X is most likely

A. an autotroph B. a saprophyte C. a parasite D. a competitor of plant Y

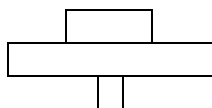
62. 2001/II/48

Some tiny insects are often found on the stem of plant X sucking its juice for food. These insects are

A. primary consumers B. secondary consumers C. tertiary consumers D. decomposers

63. 2001/II/56

The diagram below shows a pyramid of numbers of organisms in a habitat :



In which of the following food chains can this pyramid of numbers be found?

- A. microscopic algae → fish → shark
- B. rice → human → tapeworm
- C. tree → caterpillar → bird
- D. grass → sheep → wolf

64. 2002/II/13

Which of the following correctly lists the mode of nutrition of a cow and a mushroom?

Cow**Mushroom**

- | | |
|--------------------------|-----------------------|
| A. autotrophic nutrition | parasitic nutrition |
| B. autotrophic nutrition | saprophytic nutrition |
| C. holozoic nutrition | parasitic nutrition |
| D. holozoic nutrition | saprophytic nutrition |

65. 2002/II/36

Animal species X has a smaller risk of extinction than animal species Y in nature. Which of the following is the least probable explanation for this?

- | | |
|--|---|
| A. X has a longer life span. | B. X has a higher ability to find food. |
| C. X has a better chance of finding mates. | D. X has a higher ability to escape from predators. |

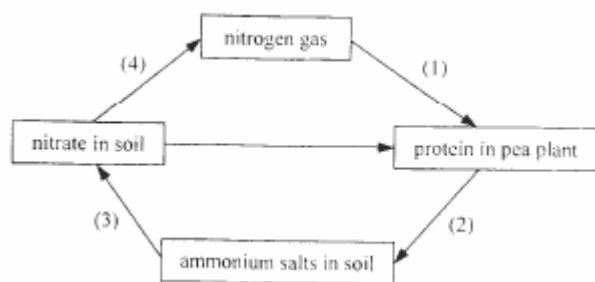
66. 2002/II/40

Red tide can be harmful to marine organisms because the algae in the red tide

- (1) may produce toxic substances.
 (2) compete with marine animals for food.
 (3) use up a lot of the oxygen in water at night.
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

67. 2003/II/52

Questions 67 and 68 refer to the diagram below, which shows part of the nitrogen cycle:



Which process may reduce the fertility of the soil?

- A. (1) B. (2) C. (3) D. (4)

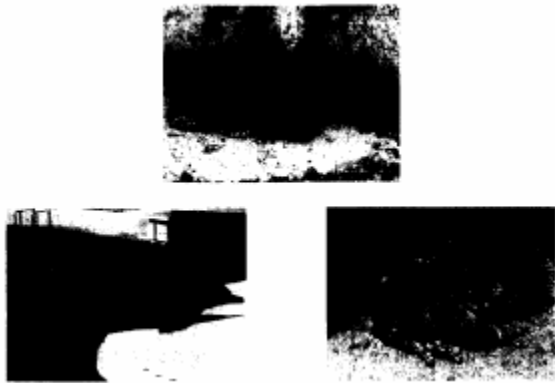
68. 2003/II/53

Which of the following statements is correct?

- A. Bacteria involved in process (1) provide carbohydrates to the pea plant.
 B. Bacteria involved in process (2) are saprophytic.
 C. Process (3) involves denitrifying bacteria.
 D. Process (4) involves nitrifying bacteria.

69. 2004/II/35

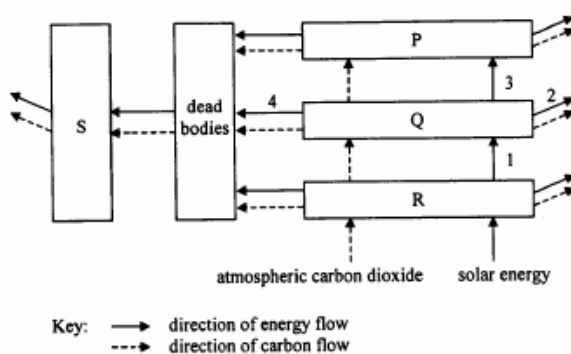
What is the common feature possessed by the three animals shown in the photographs?



- A. laying eggs B. breathing with lungs
C. presence of scale on the skin D. living both in water and land

70. 2004/II/52

Questions 70 and 72 refer to the diagram below, which shows the flows of energy and carbon in an ecosystem. P, Q and R represent different trophic levels and S represents another group of organisms in the ecosystem.



Organisms in S are

- A. predators B. pathogens C. parasites D. saprophytes

71. 2004/II/53

Energy is lost from the ecosystem through process 2. What is this process?

- A. decomposition B. transpiration C. respiration D. excretion

72. 2004/II/54

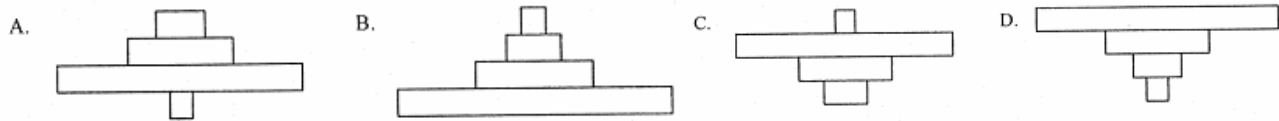
With reference to trophic level Q, the largest amount of energy flow occurs in

- A. 1 B. 2 C. 3 D. 4

73. 2005/II/21

Which of the following correctly represents the pyramid of biomass for the food chain below?

Grass → grasshopper → small bird → hawk



74. 2005/II/41

Insecticides are found in the body of penguins living in the South Pole, which is separated from farming areas by oceans. How do insecticides in the farming areas get into the body of penguins?

- A. The penguins feed on fish that contain insecticides
- B. The penguins breathe in air polluted by insecticides
- C. The penguins drink seawater contaminated by insecticides
- D. The penguins absorb insecticides in the seawater through the body surface.

75. 2006/II/35

The following food chain shows the feeding relationship between a small tree, a leaf-cutting ant and Ant-eater, a mammal which only feeds on ants : (Hint: Each small tree normally supports one nest of a leaf-cutting ants.)

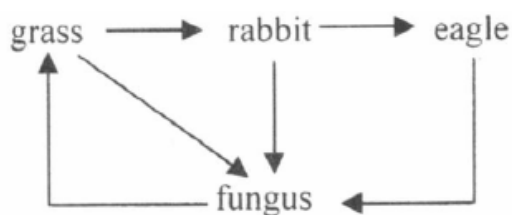
small tree → leaf-cutting ant → ant-eater

Which of the following pyramids of numbers can represent the food chain above?



76. 2006/II/36

The following flowchart shows the relationship of some organisms in a community:

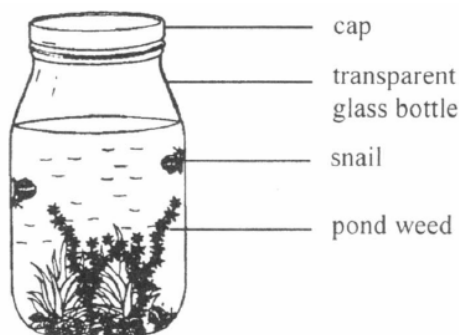


Which of the following correctly describes the relationship shown in the flowchart?

- A. It shows the transfer of heat among organisms
- B. It shows the energy flow through the food web
- C. It shows the feeding relationship of the organisms
- D. It shows the cycling of materials in the community

77. 2006/II/37

Some pond weeds and snails were put in a glass bottle as shown in the following diagram. The bottle was sealed with a cap and put under light for a few days. The pH value of the water in the bottle was found to decrease during this period.



Which of the following methods can restore the pH value of the water?

- A. put the bottle in darkness B. put more snails into the bottle
C. remove the cap from the bottle D. add more pond weeds into the bottle

78. 2006/II/38

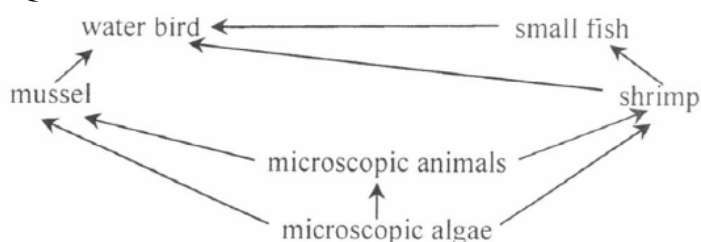
In the nitrogen cycle, which process(es) involve(s) decomposers?

- (1) conversion of protein to ammonium ion
(2) conversion of ammonium ion to nitrate
(3) conversion of nitrate to nitrogen gas

- A. (1) only B. (1) and (2) only C. (2) and (3) only D. (1),(2) and (3)

79. 2006/II/43

Questions 79 and 81 refer to the food web shown below:



In the food web, the relationship(s) between the water bird and small fish is/are

- (1) predation
(2) competition
(3) commensalisms

- A. (1) only B. (1) and (2) only C. (2) and (3) only D. (1), (2) and (3)

80. 2006/II/44

The highest trophic level in this food web is

- A. the 3rd trophic level B. the 4th trophic level C. the 5th trophic level D. the 6th trophic level

81. 2006/II/45

Which of the following is the short-term effect of removing the shrimp from the food web?

- A. The number of mussels will decrease B. The number of small fish will increase
C. The number of water birds will increase D. The number of microscopic animals will decrease

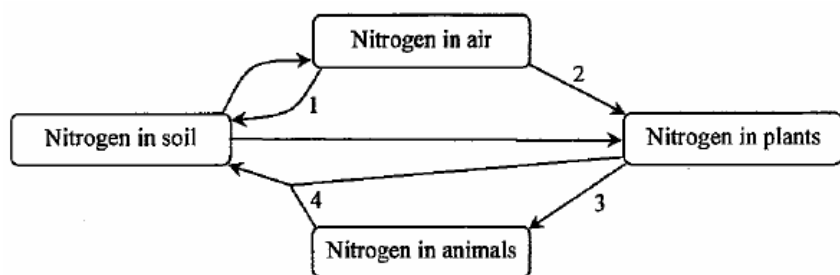
82. 2007/II/5

Which of the following ways of using the vegetation from the same piece of land provides the greatest amount of energy to human beings?

- A. to provide food for direct human consumption
B. to raise cow to provide milk for human consumption
C. to raise cow to provide meat for human consumption
D. to raise cow, using half to provide milk and the other half to provide meat for human consumption

83. 2007/II/37

Questions 83 and 85 refer to the diagram below, which shows a simplified nitrogen cycle.



Which of the following correctly identifies process 2 and 4?

- | Process 2 | Process 4 |
|----------------------|------------------|
| A. nitrification | decomposition |
| B. nitrogen fixation | denitrification |
| C. nitrogen fixation | decomposition |
| D. nitrification | denitrification |

84. 2007/II/38

Microorganisms play an important role in the processes

- A. 1,2 and 3 B. 1,2 and 4 C. 1,3 and 4 D. 2,3 and 4

85. 2007/II/39

Nitrogen can be found in animals as a component of

- (1) amino acids
(2) nucleic acids
(3) urea
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

86. 2007/II/43

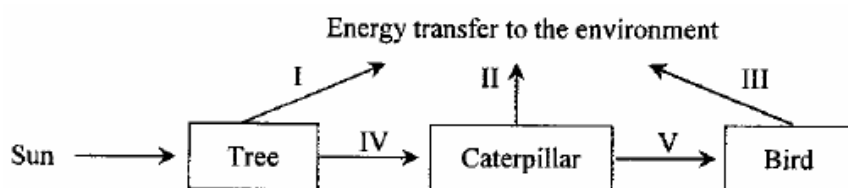
Mikania micrantha (薇甘菊) is a plant that grows rapidly on the neighbouring plants, thus reducing the amount of light

That reaches them. Its relationship with the neighbouring plants is

- A. competition B. mutualism C. parasitism D. predation

87. 2008/II/3

Questions 87 and 88 refer to the diagram below, which shows the energy flow along three groups of organisms in an ecosystem:



Energy could be transferred to the environment through

- (1) egestion
- (2) excretion
- (3) respiration

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

88. 2008/II/4

Which of the following comparisons about the amount of energy transferred via the labeled arrows is correct?

- | | Less energy | More energy |
|----|-------------|-------------|
| A. | I | IV |
| B. | II | III |
| C. | IV | II |
| D. | V | IV |

89. 2008/II/5

Questions 89 and 90 refer to the photograph below, which shows an organisms found in a local country park:

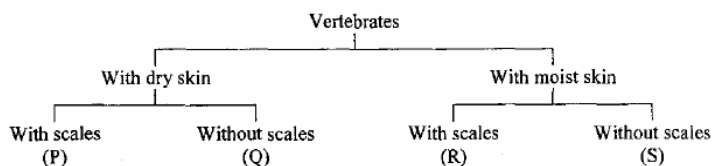


The green body colour of this organism allows it to

- A. hide in its natural habitat
- B. protect itself from mechanical injury
- C. give a warning signal to other organisms
- D. attract its mate during the reproductive season

90. 2008/II/6

The simple key below lists some features of four different vertebrate groups P, Q, R and S.

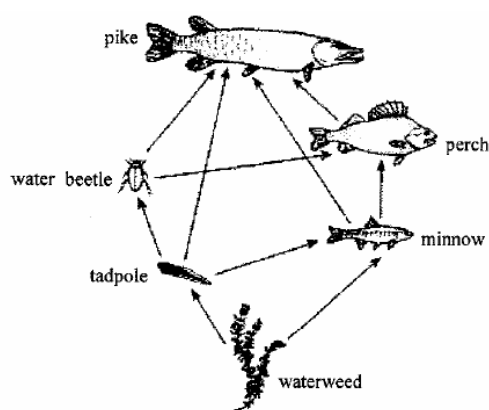


The organism shown in the above photograph belongs to vertebrate group

- A. P B. Q C. R D. S

91. 2008/II/37

Questions 91 and 93 refer to the diagram below, which shows a simplified food web of a fresh water habitat:



Which of the following organisms is a tertiary consumer?

- A. the perch B. the tadpole C. the minnow D. the water beetle

92. 2008/II/38

By referring to the relationship between tadpole and minnow, which of the following best indicates the effect of this relationship on each of them?

Key + shows that the organism benefits from the relationship

— shows that the organism suffers a loss in the relationship

	Tadpole	Minnow		Tadpole	Minnow
A.	+	+	B.	+	—
C.	—	+	D.	—	—

93. 2008/II/39

If the fresh water habitat is polluted by DDT (an insecticide) from nearby farmland, the pike will have the highest concentration of DDT in its body. Which of the following is related to this phenomenon?

- A. The pike is the top consumer in the food web
 B. The pike is the largest organism in the food web
 C. The pike has the smallest population size in the food web
 D. The pike feeds on four different organisms in the food web.

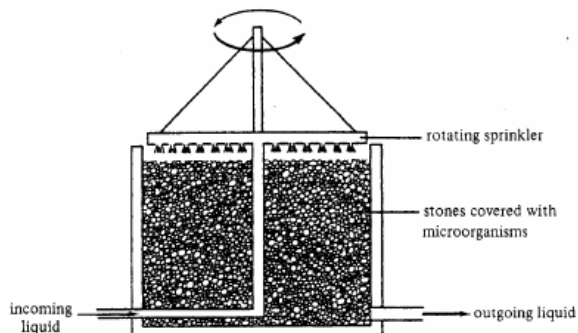
1. 1993/II/58

Which of the following changes in the environment would promote the decomposition of leaf litter in tropical rain forest?

- | Air temperature | Humidity |
|------------------------|-----------------|
| A. increase | decrease |
| B. increase | increase |
| C. decrease | increase |
| D. decrease | decrease |

2. 1993/II/59

Question 2 and 3 refer to the diagram below which shows part of the sewage treatment plant:



The rotating sprinkler provides air to this part of the sewage treatment plant in order to

- A. supply oxygen to the microorganisms.
- B. oxidize the toxic substances in the sewage.
- C. break down the organic matter into simple forms.
- D. sterilize the liquid so that it could be used for irrigation.

3. 1993/II/60

Which of the following statements about the outgoing liquid is correct?

- A. It contains no bacteria
- B. It is suitable for drinking
- C. It contains no mineral salts
- D. It has a lower content of organic nutrients

4. 1994/II/58

Many countries do not allow the use of DDT as an insecticide because

- A. it is very harmful to plants.
- B. it cannot be decomposed by living organisms.
- C. it can be readily excreted by insects.
- D. it is no longer effective in killing insect pests.

5. 1994/II/60

Red tides are probably caused by

- A. high tides.
- B. an oil spill in the water.
- C. a lack of oxygen in the water.
- D. a high nitrogen content in the water.

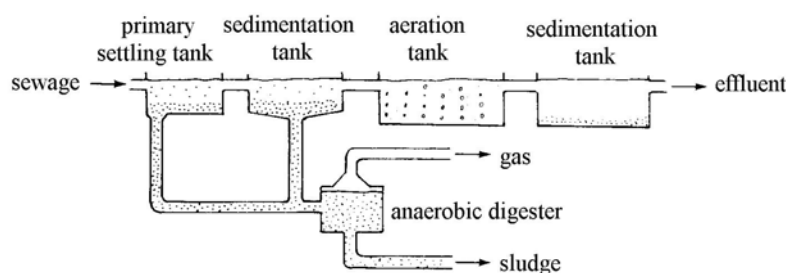
6. 1995/II/54

Burning of fossil fuels is blamed for the corrosion of stone buildings and damage to forests. Which of the following pollutants is the main cause of the damage ?

- A. carbon particles B. carbon dioxide C. sulphur dioxide D. ozone

7. 1997/II/55

Questions 7 and 8 refer to the diagram below which shows the layout of a sewage treatment plant:



What are the effects of pumping air into the aeration tank?

- (1) to stir up the sewage
(2) to encourage bacterial growth
(3) to reduce the unpleasant smell produced

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

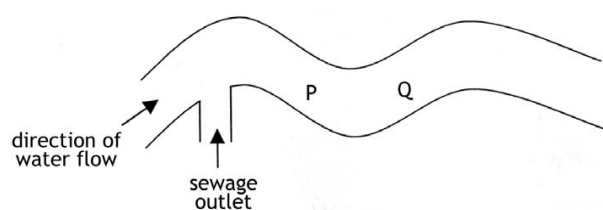
8. 1997/II/56

The reactions in the anaerobic digester involve the action of

- A. fungi. B. algae. C. mosses. D. bacteria.

9. 1998/II/58

Questions 9 to 11 refer to the diagram below which shows a river and a sewage outlet :



From the sewage outlet to site P, the concentration of ammonia in water increases. Which of the following correctly describes the change in the levels of dissolved oxygen and the bacterial population in water?

- | Level of dissolved oxygen | Bacterial population |
|---------------------------|----------------------|
| A. decreases | decreases |
| B. decreases | increases |
| C. increases | decreases |
| D. increases | increases |

10. 1998/II/59

The population of algae increases from P to Q because there is an increase in

- A. the amount of organic matter. B. the amount of suspended solids.
C. the concentration of nitrates. D. the concentration of dissolved carbon dioxide.

11. 1998/II/60

Which of the following processes helps to decompose the organic matter in the sewage?

- A. allowing the sewage to settle B. pumping air into the sewage
C. adding chlorine to the sewage D. filtering the sewage

12. 1999/II/53

If untreated sewage is discharged into a river, which of the following changes would occur in the water a short distance downstream from the site of discharge?

	Bacterial population	Algal population	Dissolved oxygen level
A.	increases	increases	increases
B.	increases	decreases	decreases
C.	decreases	decreases	increases
D.	decreases	increases	decreases

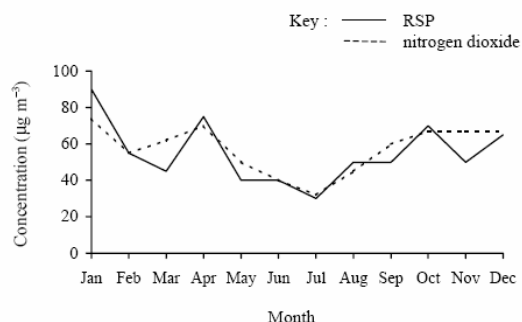
13. 1999/II/55

If the same kind of crop is grown in a field for many years,

- A. soil erosion will be prevented.
B. the population of insect pests will increase.
C. the mineral content of the soil will remain constant.
D. the level of atmospheric carbon dioxide will decrease.

14. 2000/II/47

Questions 14 and 15 refer to the graph below, which shows the monthly variations of nitrogen dioxide and respirable suspended particulates (RSP) in the atmosphere in Central and Western District of Hong Kong during the year 1997.



Which of the following statements concerning the graph may be incorrect ?

- A. The level of RSP in January is twice of that in March.
- B. The fluctuations in the levels of nitrogen dioxide and RSP follow a similar pattern.
- C. The levels of nitrogen dioxide and RSP in summer are lower than those in winter.
- D. The amounts of nitrogen dioxide and RSP released into the atmosphere are greatest in January.

15. 2000/II/48

Exhaust gas from cars is the main source of nitrogen dioxide. Which of the following is not a probable cause of the high level of nitrogen dioxide recorded in December and January ?

- A. The relative humidity of air is lower.
- B. There are more cars on the road.
- C. The air temperature is lower.
- D. There is less rainfall.

16. 2000/II/55

If fertilizers in farmlands are drained into the sea, they may

- A. poison the fish in the sea.
- B. promote the growth of algae.
- C. reduce the oxygen content of the seawater.
- D. stimulate an increase in the bacterial population.

17. 2001/II/51

In many industrial countries, a lot of trees have been killed as a result of air pollution. Which air pollutant is the major cause of death of these trees?

- A. ozone
- B. carbon dioxide
- C. sulphur dioxide
- D. carbon monoxide

18. 2001/II/58

Which of the following is not considered as a type of pollution?

- A. dumping rubbish into the harbour
- B. releasing exhaust gas from motor cars
- C. setting the TV to a high volume at midnight
- D. clearing woodland for building housing estates

19. 2003/II/40

Scientists found that the concentration of carbon dioxide in the atmosphere has changed from an average of 315ppm in 1959 to 370ppm in 2000. Which of the following may be caused of this change?

- A. extinction of wild animals
- B. depletion of the ozone layer
- C. destruction of tropical rain forests
- D. increase in global air temperature

20. 2003/II/41

In the Northern Hemisphere, the atmospheric carbon dioxide concentration in summer is lower than that in winter because in summer

- A. there are less volcanic activities.
- B. there is a greater amount of rainfall.
- C. animals have a lower rate of respiration.
- D. plants have a higher rate of photosynthesis.

21. 2003/II/46

Which of the following is not a harmful effect of large-scale agricultural activities on the environment?

- A. increase in soil temperature
- B. increase in pest population
- C. loss of natural habitats
- D. soil erosion

22. 2004/II/25

Which of the following farming practices would lead to a rapid growth of algae in nearby ponds?

- A. spraying the crops with insecticides frequently.
- B. growing a large number of crops within a small area.
- C. adding a large amount of organic matters to the farmland.
- D. applying a large amount of inorganic fertilizers to the farmland.

23. 2004/II/37

Aerobic bacteria are important in the process of sewage treatment because they help to

- A. break down the organic substances in the sewage.
- B. release energy from sewage in a usable form.
- C. remove the excess mineral salts in sewage.
- D. break down the detergent in the sewage.

24. 2004/II/43

Compared with growing different kinds of crops in a field, monoculture would lead to

- A. better adaptability of the crop.
- B. an increase in the pest population.
- C. decreased pollution of the environment.
- D. full utilization of different minerals in the soil.

25. 2005/II/14

Based on the idea that global warming is caused by a steady increase in carbon dioxide concentration in the atmosphere, which of the following may contribute to global warming?

- (1) burning of coal and petroleum
- (2) destruction of tropical rain forest
- (3) depletion of ozone in the atmosphere

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

26. 2008/II/2

Which of the following is/are pollutant(s) found in exhaust fumes from vehicles?

- (1) carbon dioxide
- (2) nitrogen dioxide
- (3) sulphur dioxide

A. (1) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

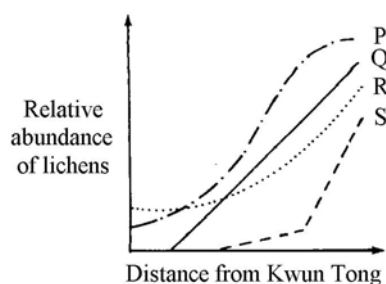
1. 1994/II/59

Which of the following statements about air pollution is incorrect?

- A. A rise in atmospheric temperature may lead to the greenhouse effect.
- B. Smoke from factories may cause blackening of the walls of buildings.
- C. Lead may cause damage to the nervous system.
- D. Sulphur dioxide may cause widespread damage to crops.

2. 1996/II/52

Lichens are sensitive to air pollution. The graph below shows the relative abundance of four species of lichens at different distances from Kwun Tong (an industrial area):



Which species is most sensitive to polluted air?

- A. P
- B. Q
- C. R
- D. S

3. 1996/II/56

Questions 3 and 4 refer to the table below which shows the air pollution indices of some places in Hong Kong. The air pollution index is an indicator of the abundance of suspended particles, sulphur dioxide, nitrogen dioxide, and other pollutant gases in air.

	Monthly average of the air pollution index				
	June	July	August	September	October
Central District	25	25	29	42	46
Kwun Tong	36	32	33	48	51
Yuen Long	23	23	25	36	42

Yuen Long has the lowest air pollution index. Which of the following is not a possible reason for it?

- A. There is less traffic.
- B. There are fewer factories.
- C. There are more farming activities.
- D. It has a lower population density.

4. 1996/II/57

From June to August, the air pollution indices are relatively low in all three areas. This may be due to

- A. frequent rainfall
- B. high temperature
- C. low relative humidity
- D. low wind speed

5. 1997/II/53

Which of the following is not a desirable way of conservation?

- A. pollution control
- B. population control
- C. recycling of used material
- D. disposal of waste at landfills

6. 1998/II/57

Which of the following is a non-renewable resource?

- A. aluminium B. timber C. water D. oxygen

7. 1999/II/54

Which of the following is a renewable resource?

- A. coal B. glass C. timber D. aluminium

8. 2001/II/59

In recent years, fishermen are banned from fishing in the South China Sea in June and July. The purpose of this measure is to

- A. allow fish to grow and reproduce. B. prevent the occurrence of red tide.
C. reduce the level of pollution of seawater. D. avoid catching fish with a high level of toxins.

9. 2004/II/34

Planting trees can help to prevent global warming because

- A. evaporation of water from trees cools the air
B. trees reduce the amount of sunlight reaching the ground
C. the carbon dioxide level in air is reduced during photosynthesis
D. oxygen produced during photosynthesis forms an ozone layer in the atmosphere

10. 2005/II/8

Timber is considered as a renewable resource because

- A. it can be reused. B. it can be recycled.
C. there is an abundant supply of timber. D. there is a continuous supply of timber.

11. 2007/II/4

Which of the following energy resources is non-renewable?

- A. tidal power B. wind power C. solar power D. nuclear power

12. 2007/II/24

Which of the following does not contribute to global warming?

- A. soil erosion B. deforestation
C. burning fossil fuel D. release of exhaust fumes from vehicles

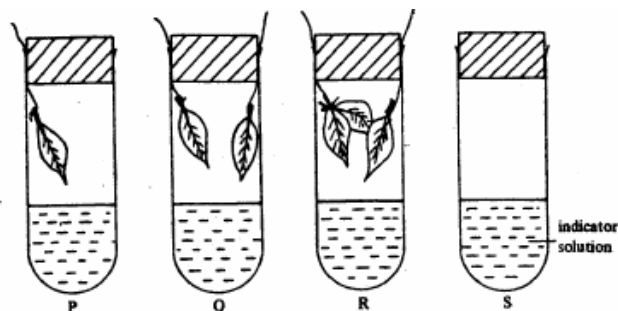
1. 1990/II/13

Which of the following processes does NOT release carbon dioxide into the atmosphere?

- A. photosynthesis B. putrefaction C. respiration D. burning

2. 1990/II/16

Questions 2 and 3 refer to the experimental set-up shown below. Each tube contains the same volume of an indicator solution but a different number of leaves. The tubes are uniformly illuminated.



The indicator solutions changes from red to purple when it becomes less acidic. In which of the tubes does the indicator solution change from red to purple most rapidly?

- A. Tube P B. Tube Q C. Tube R D. Tube S

3. 1990/II/17

If a similar set-up were kept in the dark for several hours, which tube would contain most oxygen at the end of the experiment?

- A. Tube P B. Tube Q C. Tube R D. Tube S

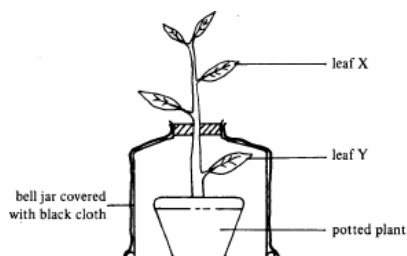
4. 1992/II/5

The oxygen released during photosynthesis of green leaves comes from

- A. air B. water C. chlorophyll D. carbon dioxide

5. 1992/II/8

The experiment set-up below was kept in the dark for 48 hours before exposing it to sunlight for another 3 hours. Leaf X and Y were then tested for starch. Which of the following would be the probable results?

**Leaf X****Leaf Y**

- A. starch present starch present
C. starch absent starch present

Leaf X**Leaf Y**

- B. starch present starch absent
D. starch absent starch absent

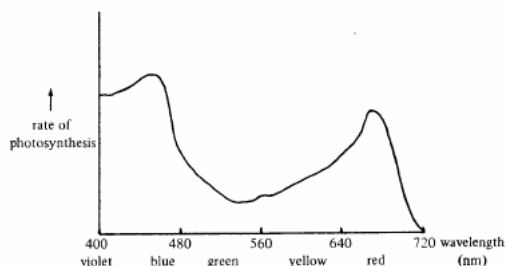
6. 1992/II/9

When testing a leaf for starch, the leaf is boiled with alcohol in a water bath to

- A. kill the cells B. make it soft C. dissolve the starches D. extract the chlorophyll

7. 1993/II/16

Questions 7 and 8 refer to the graph below. The graph shows the rate of photosynthesis of a green plant when it is placed under lights of different colours:



Which coloured lights are most effective for photosynthesis?

- A. yellow and green B. yellow and blue C. red and green D. red and blue

8. 1993/II/17

Which of the following would occur if only green light reached the earth?

- A. The total number of animals on earth would decrease.
 B. The amount of food produced would increase.
 C. The amount of oxygen in the atmosphere would increase.
 D. The amount of carbon dioxide in the atmosphere would decrease.

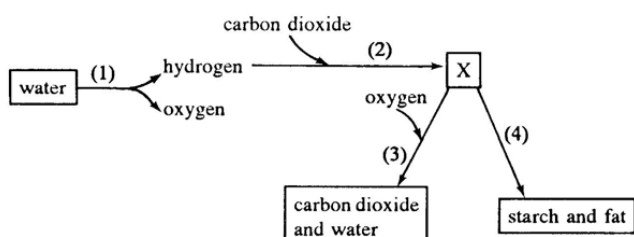
9. 1993/II/23

In photosynthesis, light is directly involved in

- A. the formation of starch. B. the splitting of water molecules.
 C. the formation of glucose molecules. D. the combination of hydrogen and carbon dioxide.

10. 1994/II/7

Questions 10 and 11 refer to the diagram below which shows certain metabolic pathways that take place in a mesophyll cell:



Which of the following processes requires light energy?

- A. (1) B. (2) C. (3) D. (4)

11. 1994/II/8

What is substance X?

- A. amino acid B. cellulose C. chlorophyll D. simple sugar

12. 1998/II/43

Which of the following processes helps to reduce the level of carbon dioxide in the atmosphere?

- A. respiration B. deforestation C. decomposition D. photosynthesis

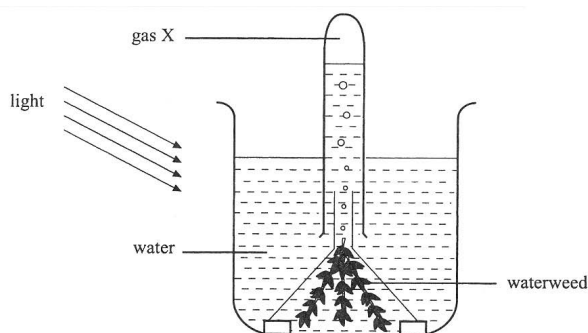
13. 2001/II/13

The oxygen produced during photosynthesis comes from

- A. water B. glucose C. chlorophyll D. carbon dioxide

14. 2002/II/5

Questions 14 and 15 refer to the set-up below, which is used to investigate the photosynthesis of a waterweed :



The waterweed produces gas X and starch from

Gas X**Starch**

- | | |
|-------------------|--------------------------|
| A. water | carbon dioxide |
| B. water | carbon dioxide and water |
| C. carbon dioxide | glucose |
| D. carbon dioxide | carbon dioxide and water |

15. 2002/II/6

Arrange in the correct order the following steps for testing the presence of starch in the green leaves of the waterweed :

- (1) Add iodine solution.
- (2) Soak the leaves in warm water.
- (3) Boil the leaves in water for two minutes.
- (4) Immerse the leaves in alcohol heated in a hot water bath.

- A. (1), (2), (3), (4) B. (2), (4), (3), (1) C. (3), (4), (2), (1) D. (4), (1), (3), (2)

16. 2005/II10

Water is a raw material for photosynthesis. In which of the following substances will the hydrogen and oxygen from water be found at the end of photosynthesis?

	Hydrogen	Oxygen
--	-----------------	---------------

- | | | |
|----|--------------|--------------|
| A. | carbohydrate | oxygen gas |
| B. | carbohydrate | carbohydrate |
| C. | hydrogen gas | oxygen gas |
| D. | hydrogen gas | carbohydrate |

17. 2005/II/42

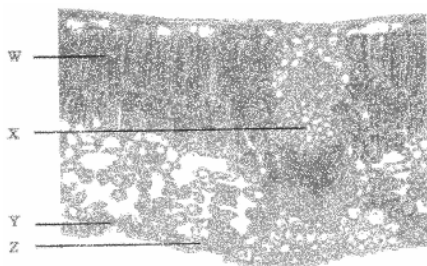
Carbohydrate produced in leaves during photosynthesis can be carried to the roots for storage. What is the form of carbohydrate transported and the path involved?

	Form of carbohydrate	Path of transport
--	-----------------------------	--------------------------

- | | | |
|----|--------|--------|
| A. | sugar | xylem |
| B. | sugar | phloem |
| C. | starch | xylem |
| D. | starch | phloem |

18. 2006/II/26

Questions 18 and 19 refer to the photomicrograph below, which shows the cross section of a leaf:



Which of the following correctly lists the function of cell types W, X and Z?

W	X	Z
----------	----------	----------

- | | | | |
|----|----------------|-----------|----------------|
| A. | support | transport | protection |
| B. | photosynthesis | transport | storage |
| C. | storage | support | photosynthesis |
| D. | photosynthesis | support | protection |

19. 2006/II/27

Which of the following comparisons of the different cell types are correct?

- (1) Cell type W contains more mitochondria than cell type Z
- (2) Cell type W contains more chloroplasts than cell type Y
- (3) Cell type X contains a larger vacuole than cell type Z

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

20. 2007/II/3

Which of the following correctly describe photosynthesis?

- (1) It is a catabolic process
- (2) It is an energy conversion process
- (3) It is a process by which producers make food

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

21. 2008/II/8

Which of the following correctly describes how a dicotyledonous leaf is adapted for photosynthesis?

- A. Epidermal cells are tightly packed
- B. Upper epidermis has fewer stomata
- C. Spongy mesophyll cells have fewer chloroplasts
- D. The cuticle covering the leaf surfaces is transparent

1. 1991/II/19

The following table shows two types of cells P and Q and the product(s) of anaerobic respiration in these cells:

<i>Cell</i>	<i>Product(s)</i>
P	Lactic acid
Q	Alcohol and carbon dioxide

Cells P and Q are most likely to

- | Cell P | Cell Q |
|----------------|---------------|
| A. muscle | yeast |
| B. guard cells | liver |
| C. liver | muscle |
| D. yeast | guard cells |

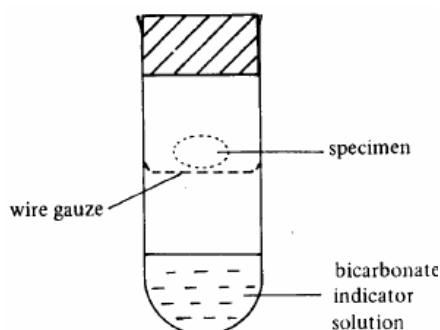
2. 1992/II/10

When compared with aerobic respiration, anaerobic respiration

- | | |
|-------------------------------|----------------------------------|
| A. releases more energy | B. oxidizes food incompletely |
| C. produces no carbon dioxide | D. occurs in microorganisms only |

3. 1992/II/11

The experimental set-up shown below was placed in a well-illuminated area. After 24 hours the bicarbonate indicator solution changed from red to purple.

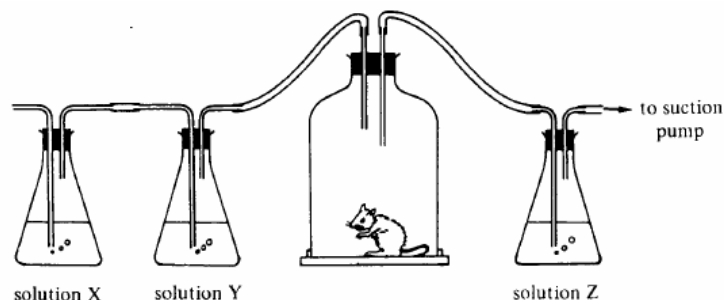


The specimen placed inside the tube would probably be

- | | | | |
|-----------------|------------------|-----------------------|-----------------------------|
| A. a green leaf | B. a grasshopper | C. a germinating seed | D. a sterilized boiled seed |
|-----------------|------------------|-----------------------|-----------------------------|

4. 1992/II/23

Questions 4 and 5 refer to the experimental set-up below which shows the release of carbon dioxide from a small mammal:



Which of the following are the correct solutions for X, Y and Z?

Solution X	Solution Y	Solution Z
A. potassium hydroxide solution	lime water	lime water
B. lime water	potassium hydroxide solution	potassium hydroxide solution
C. lime water	potassium hydroxide solution	lime water
D. potassium hydroxide solution	lime water	potassium hydroxide solution

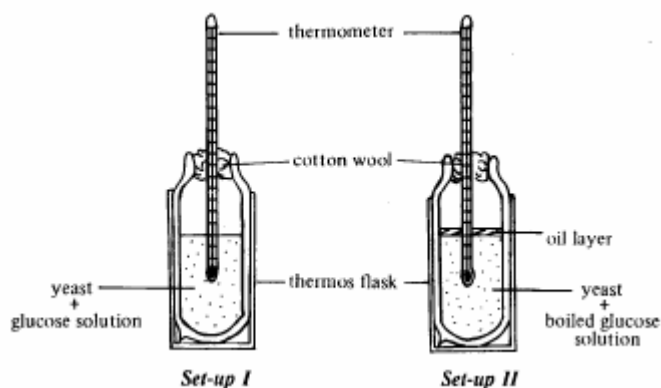
5. 1992/II/24

Which of the following would be the probable results of the experiment?

Solution X	Solution Y	Solution Z	Solution X	Solution Y	Solution Z
A. milky	clear	clear	B. clear	clear	milky
C. clear	milky	milky	D. milky	milky	clear

6. 1993/II/24

Questions 6 and 7 refer to the diagram below which shows two set-ups used to investigate respiration of yeast under different conditions:



Which of the following substances will be produced?

Set-up I	Set-up II	Set-up I	Set-up II
A. carbon dioxide	carbon dioxide and ethanol	B. carbon dioxide	carbon dioxide and ethanol
C. carbon dioxide and lactic acid	carbon dioxide	D. carbon dioxide and ethanol	carbon dioxide

7. 1993/II/25

If the experiment is conducted at a room temperature of 25°C, what will be the probable thermometer readings after one hour?

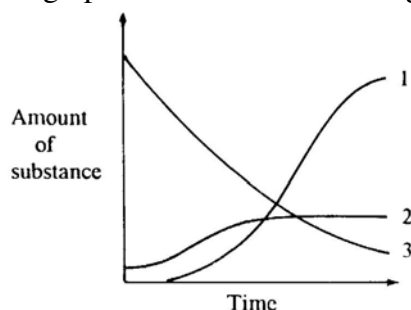
	Set-up I	Set-up II
A.	24°C	27°C
B.	27°C	24°C
C.	27°C	25°C
D.	28°C	27°C

8. 1996/II/22

Questions 8 and 9 refer to the information below:

In a set-up, some living yeast cells were added to a 10% glucose solution under anaerobic conditions.

The graph below shows the changes in the amount of three substances in the set-up:



Which curves represent yeast and glucose respectively?

	Yeast	Glucose
A.	1	2
B.	1	3
C.	2	3
D.	3	1

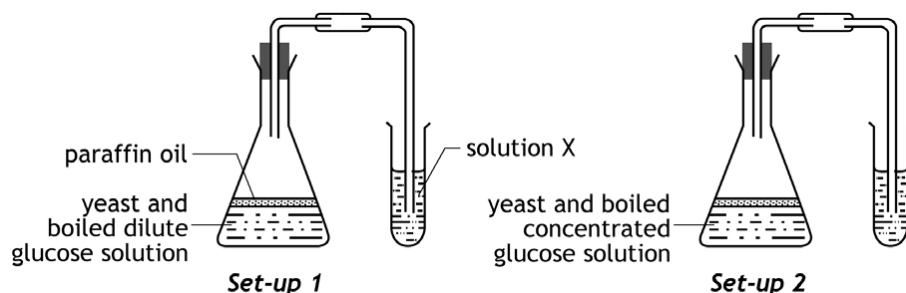
9. 1996/II/23

What products are formed in the set-up?

- | | |
|-----------------------------------|--|
| A. ethanol and lactic acid | B. ethanol and carbon dioxide |
| C. lactic acid and carbon dioxide | D. ethanol, lactic acid and carbon dioxide |

10. 1998/II/17

Questions 10 to 12 refer to the diagram below which shows two set-ups used to study the anaerobic respiration of yeast :



The table below shows the results obtained :

<i>Set-up</i>	<i>Result</i>
1	Alcohol produced
2	No alcohol produced

Which of the following can be deduced from the results?

- A. Yeast multiplies faster at low glucose concentration.
- B. Yeast respire aerobically at high glucose concentration.
- C. Yeast is killed by dehydration at high glucose concentration.
- D. Yeast cannot carry out anaerobic respiration at high glucose concentration.

11. 1998/II/18

Which of the following are essential to ensure an anaerobic condition for the respiration of the yeast ?

- (1) stopper the flask
- (2) vaseline the joints
- (3) add paraffin oil
- (4) boil the glucose solution

- A. (1) and (2) only B. (3) and (4) only C. (1), (2) and (3) only D. (2), (3) and (4) only

12. 1998/II/19

Solution X is used to test the gas produced in the flask. Solution X can be

- (1) lime water.
- (2) sodium hydroxide solution.
- (3) sodium hydrogencarbonate solution.

- A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

13. 2000/II/4

Which of the following reactions occur(s) in the skeletal muscle when a person is performing vigorous exercise?

- (1) glucose \rightarrow lactic acid
- (2) glucose \rightarrow lactic acid + carbon dioxide
- (3) glucose + oxygen \rightarrow carbon dioxide + water

A. (1) only B. (2) only C. (1) and (3) only D. (2) and (3) only

14. 2000/II/5

What is the significance of anaerobic respiration to yeast?

- A. It produces a large amount of ethanol.
- B. It provides energy to yeast when there is a lack of oxygen.
- C. Yeast can only use anaerobic respiration to release energy from food.
- D. It provides additional energy to yeast when it is undergoing budding.

15. 2001/II/6

During a 100 m race, the lactic acid concentration in the blood of an athlete increases rapidly. Which of the following word equations represents the process that leads to the formation of lactic acid?

- A. glucose \rightarrow lactic acid
- B. glucose \rightarrow lactic acid + carbon dioxide
- C. glucose + oxygen \rightarrow lactic acid + water
- D. glucose + oxygen \rightarrow lactic acid + water + carbon dioxide

16. 2001/II/16

For a person who carries out physical exercise regularly, which of the following will not occur?

- A. His joints will become more flexible.
- B. He will have a lower heart rate at rest.
- C. He will breathe at a higher rate at rest.
- D. He will develop a larger vital capacity.

17. 2002/II/7

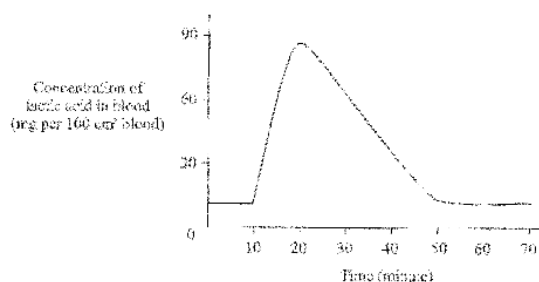
Which of the following can carry out anaerobic respiration?

- (1) biceps
- (2) yeasts
- (3) xylem vessels

A. (1) only B. (2) only C. (1) and (2) only D. (1), (2) and (3)

18. 2002/II/32

Questions 18 and 19 refer to the graph below, which shows the change in lactic acid concentration in the blood of a person when he performed vigorous exercise :



The person stopped doing exercise at

- A. the 10th minute. B. the 20th minute. C. the 50th minute. D. the 70th minute.

19. 2002/II/33

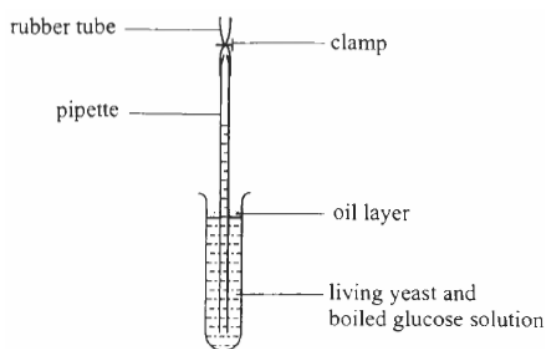
Which of the following lead to the change in lactic acid concentration in the blood during the 10th to 20th minute?

- (1) an increase in the breakdown of glucose
 (2) a reduction in oxygen supply to the muscles
 (3) an increase in energy demand of the muscles

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

20. 2003/II/24

Questions 20 and 21 refer to the diagram below, which shows an experiment set-up used to study the action of yeast on glucose :



Which of the following correctly states and explains the change in liquid level in the pipette after 30 minutes?

Change in liquid level

Cause of the change

- | | |
|----------|----------------------------|
| A. rises | ethanol is produced |
| B. rises | oxygen is produced |
| C. drops | glucose is consumed |
| D. drops | carbon dioxide is produced |

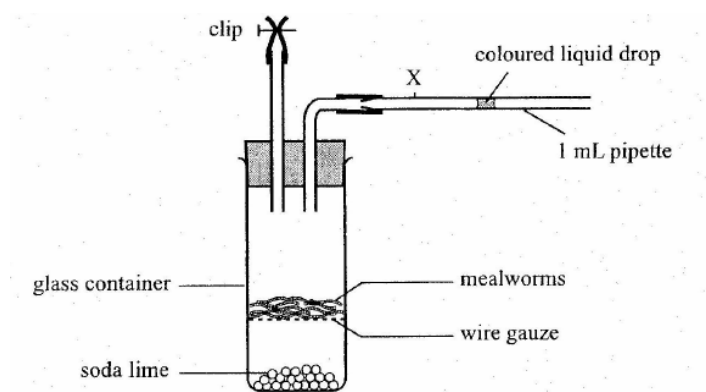
21. 2003/II/25

To show that living yeast is essential for bringing about the change in liquid level in the pipette, the control set-up should contain

- A. boiled glucose solution only
- B. living yeast and boiled water
- C. dead yeast and boiled water
- D. dead yeast and boiled glucose solution

22. 2005/II/6

Questions 22 and 23 refer to the set-up below, which is used to estimate the rate of respiration of mealworms:



At the end of the experiment, the liquid drop was found to be at position X. The movement of the liquid drop indicated

- A. the amount of oxygen used by the mealworms.
- B. the amount of carbon dioxide produced by the mealworms.
- C. the amount of heat released by the mealworms.
- D. the change in atmospheric pressure.

23. 2005/II/7

What modification should be made in the above set-up in order to prepare a control for this investigation?

- A. replacing soda lime with distilled water
- B. removing the mealworms from the set-up
- C. putting the set-up in a refrigerator set at 5°C
- D. covering the glass container with black paper

24. 2005/II/15

Which of the following cells probably have the lowest rate of respiration?

- A. liver cells
- B. muscle cells
- C. cells of the wall of kidney tubules
- D. epithelial cells of air sacs of the lungs

25. 2005/II/40

Why is anaerobic respiration important to skeletal muscles during exercise?

- A. The muscle cells cannot carry out aerobic respiration due to a lack of oxygen
- B. The muscle cells can oxidize the lactic acid formed in anaerobic respiration
- C. Anaerobic respiration provides additional energy for muscle contraction
- D. More energy is released from a glucose molecule in anaerobic respiration than in aerobic respiration

26. 2006/II/9

Which of the following correctly compares alcoholic fermentation and lactic acid fermentation?

Alcoholic fermentation

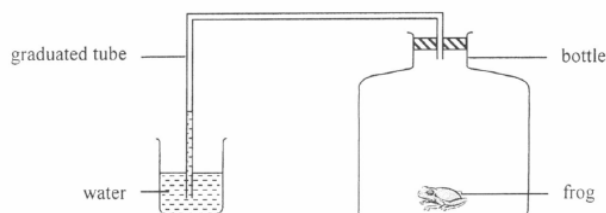
- A. produces carbon dioxide
- B. uses alcohol as the substrate
- C. by-products will be further metabolized
- D. occurs in plants only

Lactic acid fermentation

- does not produce carbon dioxide
- uses lactic acid as the substrate
- by-products will not be further metabolized
- occurs in animals only

27. 2006/II/19

Questions 27 and 28 refer to the diagram below, which shows a set-up designed by a student to study the respiration of a frog:



The set-up failed to show a rise in water level in the graduated tube as expected. How should the student correct the set-up?

- A. The bottle should be filled with oxygen.
- B. The bottle should be wrapped with cotton wool.
- C. A bag of soda lime should be placed inside the bottle.
- D. The water should be replaced by hydrogencarbonate indicator solution.

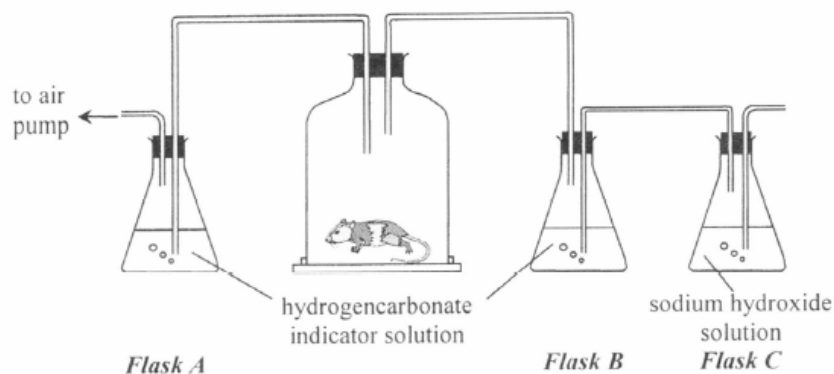
28. 2006/II/20

After the correction, the experiment was repeated. There was a rise in water level in the graduated tube showing a difference in readings of 4cm^3 . Which of the following is the correct interpretation of the result?

- A. The amount of oxygen breathed in by the frog is 4cm^3 .
- B. The amount of carbon dioxide breathed out by the frog is 4cm^3 .
- C. The amount of oxygen breathed in is 4cm^3 more than the amount of carbon dioxide breathed out by the frog.
- D. The amount of oxygen breathed in is 4cm^3 less than the amount of carbon dioxide breathed out by the frog.

29. 2006/II/21

Questions 29 and 30 refer to the diagram below, which shows a set-up used to investigate the respiration of a mammal. The air pump was switched on for 20 minutes.

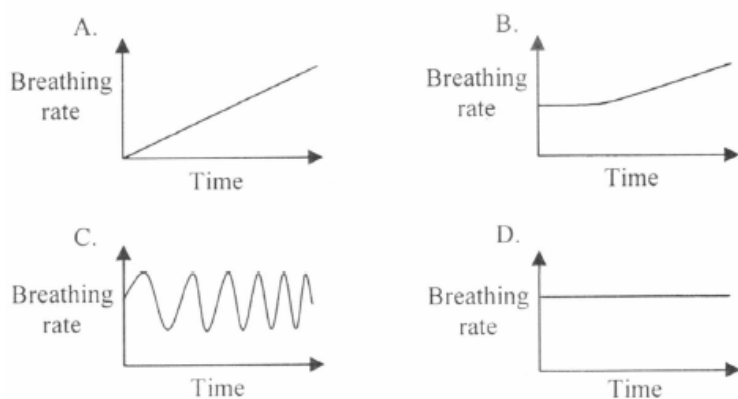


Which of the following correctly states the colour of the hydrogencarbonate indicator solution in flask A and flask B after 20 minutes?

- | | Flask A | Flask B |
|----|----------------|----------------|
| A. | red | purple |
| B. | red | yellow |
| C. | yellow | purple |
| D. | purple | red |

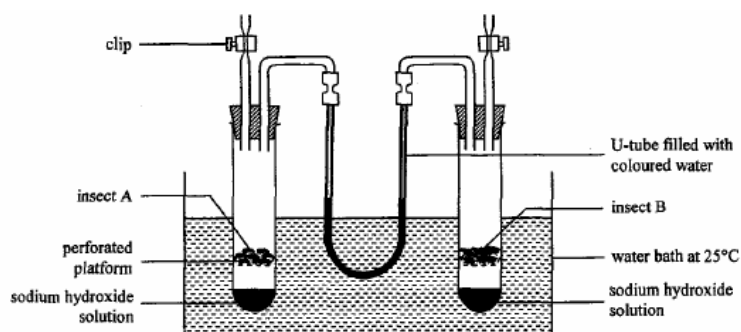
30. 2006/II/22

If the air pump is switched off, which of the following graphs shows the breathing rate of the mammal for the next five minutes?



31. 2007/II/29

Questions 31 and 32 refer to the experimental set-up below, which was used to compare the rate of respiration of two different types of insects. Insects of the same mass were placed into the test tubes.



The movement of coloured water in the U-shaped is caused by the

- A. heat released B. food consumed C. oxygen absorbed D. carbon dioxide released

32. 2007/II/30

Which of the following modifications can shorten the time for the experiment?

- A. use a larger test tube B. use a larger water bath
C. use a U-tube with a larger internal diameter D. use a water bath set at a higher temperature

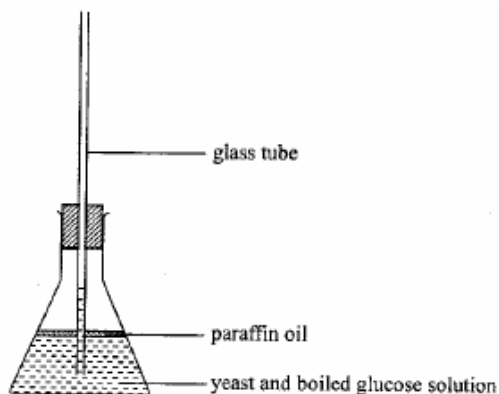
33. 2007/II/42

When a person is running 800m race, which of the following changes will happen in this body?

- (1) The blood volume returning to the heart increases
(2) The rate of anaerobic respiration in the exercising muscles increases
(3) The rate of aerobic respiration in the exercising muscles remains unchanged
A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

34. 2008/II/32

Questions 34 and 35 refer to the following set-up used to study the anaerobic respiration of yeast.



During the experiment, the liquid level inside the glass tube rises. This is mainly due to the release of

- A. water B. alcohol C. heat energy D. carbon dioxide

35. 2008/II/33

To provide an anaerobic condition, which of the following steps are necessary?

- (1) add paraffin oil
- (2) stopper the flask
- (3) boil the glucose solution

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

36. 2008/II/34

In respiration, chemical energy in the substrate is converted to heat energy, chemical energy in ATP and chemical energy in by-products. Which of the following correctly compares aerobic and anaerobic respiration?

- (1) Aerobic respiration converts more energy to heat energy
- (2) Aerobic respiration converts more chemical energy in ATP
- (3) Aerobic respiration converts more energy to chemical energy in by-products

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

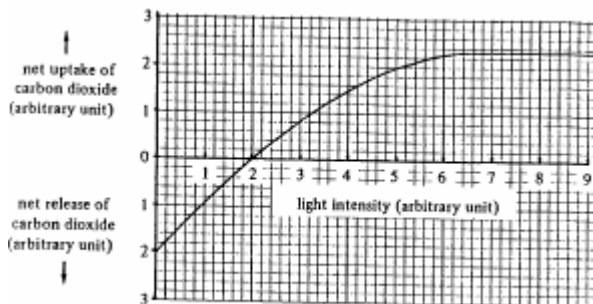
1. 1990/II/12

Nitrogen compounds are required by plants to form

- A. glucose B. cellulose C. fatty acids D. amino acids

2. 1991/II/21

Questions 2 and 3 refer to the graph below which shows the exchange of carbon dioxide between a green plant and the atmosphere under different light intensities:



Which of the following can be reduced from the graph?

- (1) At a light intensity of 1 arbitrary unit, only respiration takes place
 (2) At a light intensity of 2 arbitrary units, there is no net carbon dioxide taken in or given out
 (3) At a light intensity of 9 arbitrary units, the rate of photosynthesis is greater than the rate of respiration
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

3. 1991/II/22

At a light intensity 5 arbitrary units, how many units of carbon dioxide are used up in photosynthesis?

- A. -2 B. 0 C. 2 D. 4

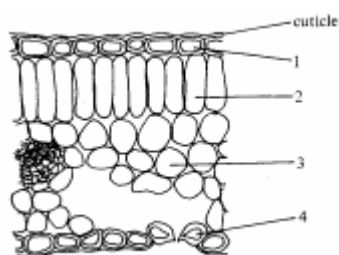
4. 1991/II/53

Which of the following about humus is correct?

- A. It promotes leaching B. It improves soil texture
 C. It decreases soil fertility D. It reduces available air spaces in soil

5. 1992/II/1

Questions 5 and 6 refer to the diagram below which shows a transverse section of a leaf:



Which of the cells are green?

- A. (1) and (4) only B. (2) and (3) only C. (1),(2) and (3) only D. (2),(3) and (4)

6. 1992/II/2

The cuticle covering the upper and lower surfaces is for

- (1) supporting the leaf
- (2) preventing the entry of germs
- (3) reducing water evaporation from the surfaces

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

7. 1993/II/15

In order to make proteins, plants require

Chemical absorbed from the soil

Chemical synthesized by the plant

- | | |
|------------------------|---------------|
| A. nitrates | carbohydrates |
| B. nitrates | vitamins |
| C. magnesium compounds | vitamins |
| D. magnesium compounds | carbohydrates |

8. 1996/II/18

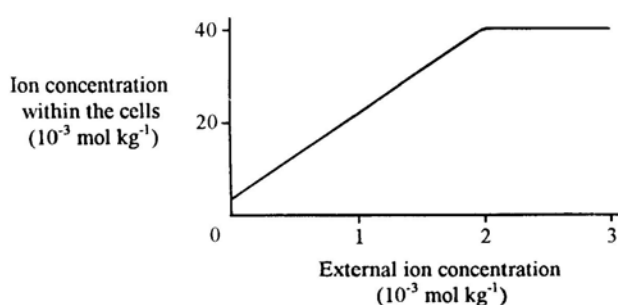
Which of following plant cells respire all the time?

- (1) xylem vessels
- (2) mesophyll cells
- (3) root hair cells

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

9. 1997/II/4

The graph below shows the effect of the change in the external concentration of an ion on the concentration of the ion within some plant cells:



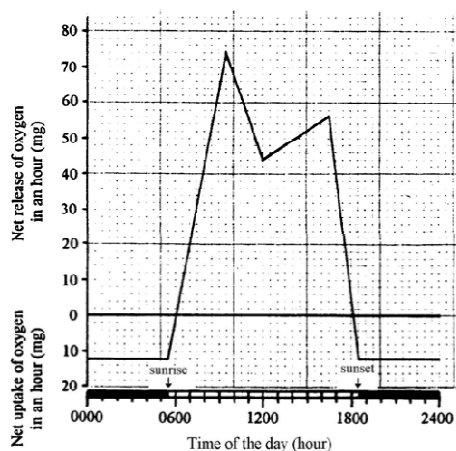
Which of the following conclusion(s) can be drawn from the graph?

- (1) The ion is taken up by the cells against a concentration gradient.
- (2) The uptake of the ion occurs only in living cells.
- (3) The cell membrane becomes impermeable to the ion when the external ion concentration reaches $2 \times 10^{-3} \text{ mol kg}^{-1}$.

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

10. 1997/II/15

Questions 10 and 11 refer to the graph below which shows the net release and net uptake of a plant over a 24-hour period:



Which of the following can be deduced from the graph?

- A. At 0600 hour, there is no respiration.
- B. The fastest rate of photosynthesis occurs at 0930 hour.
- C. The lowest rate of respiration occurs at 1200 hour.
- D. At 1800 hour, there is no photosynthesis.

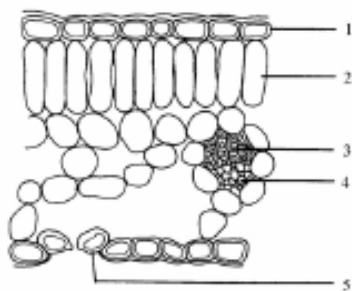
11. 1997/II/16

Assuming that the plant has the same respiration rate throughout the 24-hour period, how much oxygen is produced by the plant in an hour at 1630 hour?

- A. 12 mg B. 44 mg C. 56 mg D. 68 mg

12. 1997/II/17

Questions 12 and 13 refer to the diagram below which shows a section of a leaf:



Which cell types are green?

- A. 1 and 4 only B. 2 and 5 only C. 1, 2 and 4 only D. 1, 2 and 5 only

13. 1997/II/18

Respiration occurs in all cell types except

- A. 2. B. 3. C. 1 and 2. D. 3 and 4.

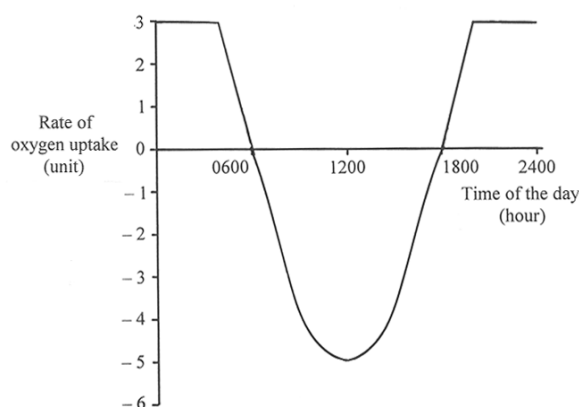
14. 1997/II/51

If inorganic nitrogen fertilizer is added to the soil, which of the following will occur?

- A. The population of nitrifying bacteria will increase.
- B. The population of denitrifying bacteria will disappear.
- C. There will be no decomposition of dead organic matter.
- D. Formation of root nodules in leguminous plants will be promoted.

15. 2000/II/9

Questions 15 and 16 refer to the graph below, which shows the rate of oxygen uptake of a plant in 24 hours :



Which of the following correctly describes the plant at 1200 hour?

- A. It carried out photosynthesis, but not respiration.
- B. It carried out photosynthesis at the maximum rate.
- C. The rate of photosynthesis was equal to the rate of respiration.
- D. The rate of photosynthesis was lower than the rate of respiration.

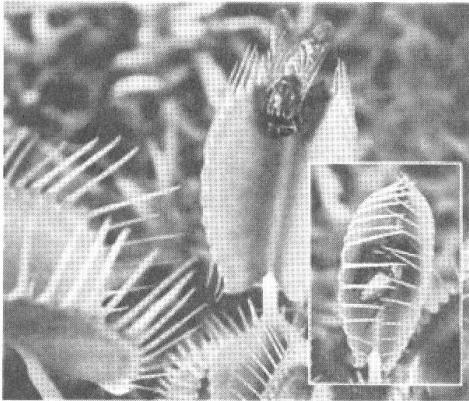
16. 2000/II/10

Based on the graph, we may conclude that at 1800 hour the rate of photosynthesis was 3 units. What assumption has to be made in order to arrive at this conclusion ?

- A. The plant did not carry out respiration at 1800 hour.
- B. The rate of photosynthesis of the plant varied at different times of the day.
- C. The rate of respiration of the plant was constant throughout the 24- hour period.
- D. The rate of respiration of the plant was equal to the rate of photosynthesis at 1800 hour.

17. 2002/II/21

The photograph below shows a plant called Venus flytrap, which feeds on small insects :



Source: Moore Clark Vodopich, *Botany*, WCB/McGraw-Hill, Inc., 1998.

Feeding on insects allows the Venus flytrap to grow well in poor soil because insects can

- | | |
|---|---|
| A. provide more water to the plant. | B. provide more energy to the plant. |
| C. increase the carbon supply to the plant. | D. increase the nitrogen supply to the plant. |

18. 2002/II/37

Organic fertilizers are more environmentally friendly than inorganic fertilizers because organic fertilizers

- | | |
|--|---|
| A. contain more minerals. | B. are readily absorbed by crops. |
| C. can increase the yield of crops faster. | D. are not easily leached away from the soil. |

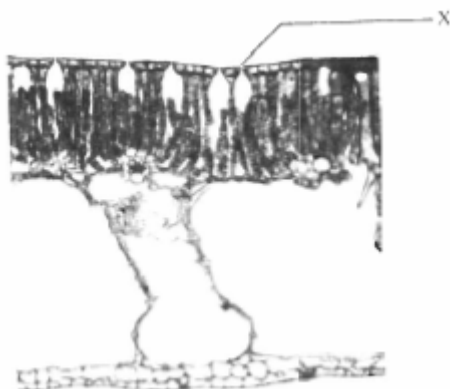
19. 2003/II/3

Which of the following correctly compares an epidermal cell and a mesophyll cell of a leaf?

- | Epidermal cell | Mesophyll cell |
|--------------------------|-----------------------|
| A. without nucleus | with nucleus |
| B. without cell wall | with cell wall |
| C. without chloroplasts | with chloroplasts |
| D. without large vacuole | with large vacuole |

20. 2003/II/27

Questions 20 and 21 refer to the following photomicrograph of a section of a leaf :



Which of the following is the function of X?

- A. for the absorption of water into the leaf B. for the transmission of sunlight into the leaf
C. for the passage of carbon dioxide into the leaf D. for the regulation of the pressure inside the leaf

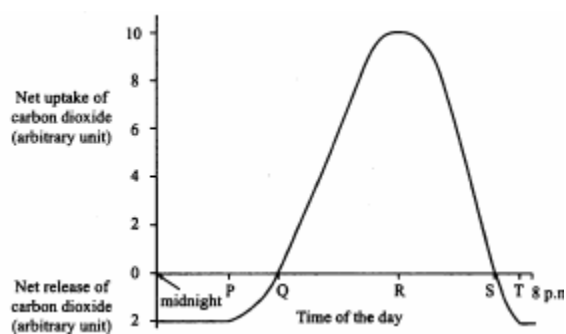
21. 2003/II/28

The section is probably taken from

- A. a floating leaf B. a submerged leaf
C. a leaf of a plant living in dry habitats D. a leaf of a plant growing on highlands

22. 2004/II/8

Questions 22 and 23 refer to the graph below, which shows the gaseous exchange of a greenleaf from midnight to 8 p.m.:



The leaf carried out photosynthesis during the period

- A. P to S B. P to T C. Q to R D. Q to S

23. 2004/II/9

What is the highest rate of photosynthesis of the leaf?

- A. 6 arbitrary units B. 8 arbitrary units
C. 10 arbitrary units D. 12 arbitrary units

24. 2004/II/49

Soil fertility may be reduced by the activity of

- A. nitrogen-fixing bacteria B. denitrifying bacteria
- C. putrefying bacteria D. nitrifying bacteria

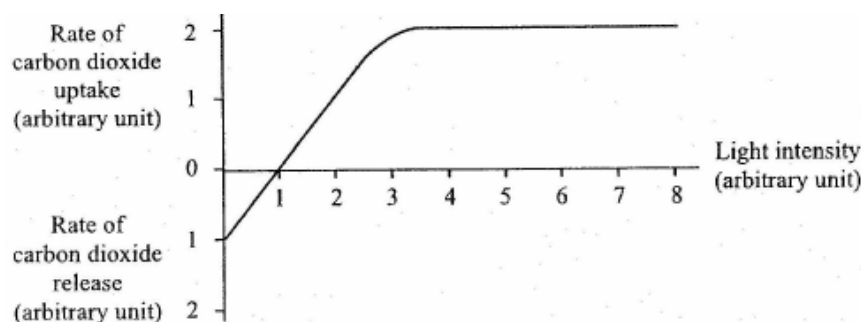
25. 2005/II/43

A student found that the leaves of a plant growing in the laboratory had turned yellow. Which of the following is the least probable explanation for this observation?

- A. shortage of nitrate in the soil B. shortage of magnesium in the soil
- C. insufficient light supply to the plant D. insufficient carbon dioxide supply to the plant

26. 2005/II/45

Questions 26 and 27 refer to the graph below, which shows the rates of carbon dioxide uptake and release of a plant under different light intensities:



When the light intensity is 6 units, what is the actual rate of photosynthesis of the plants in terms of the rate of carbon dioxide uptake?

- A. 1 unit B. 2 units C. 3 units D. 4 units

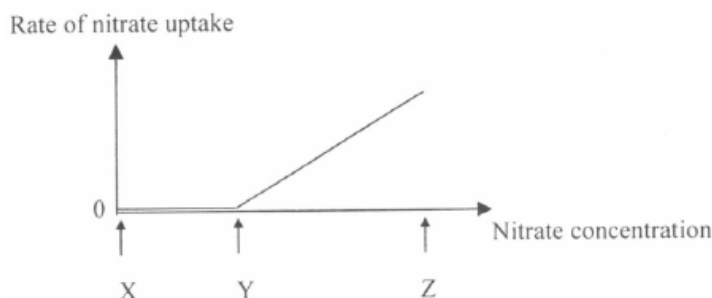
27. 2005/II/46

After 1 unit of light intensity, the rate of carbon dioxide uptake is zero. This is because at this light intensity,

- A. the plant cannot undergo photosynthesis
- B. the closure of stomata stops gas exchange
- C. the rate of photosynthesis of the plant is equal to its rate of respiration
- D. the plant takes in oxygen instead of carbon dioxide from the atmosphere

28. 2006/II/6

The graph below shows the rate of nitrate uptake by root hair cells. The root hair cells are immersed in solutions of different nitrate concentrations.



Which of the following can be deduced from the graph?

- A. Between X and Y, the root hair cells take up nitrate by diffusion
- B. Between Y and Z, the root hair cells take up nitrate by diffusion
- C. Between Y and Z, the root hair cells take up nitrate by active transport
- D. Between X and Z, the root hair cells take up nitrate by active transport and diffusion

29. 2007/II/2

Which of the following features enables a plant to survive successfully in a shady environment?

- A. stem with more lenticels
- B. stem with less supporting tissue
- C. leaf with very broad and flat leaf blade
- D. leaf with similar stomatal density on both surfaces

30. 2007/II/40

The following shows a label of a chemical fertilizer

Note:

1. Do not overfeed the plant with this fertilizer
2. Shake before you use
3. Use every 7 to 10 days

What may happen if we overfeed of the plant with the fertilizer?

- A. Water is drawn out of the roots and there will not be enough water for the plant
- B. The roots grow so fast that they will use up the oxygen in soil air
- C. The roots absorb too much salt and retain too much water
- D. The leaves become so large that they will overlap with one another

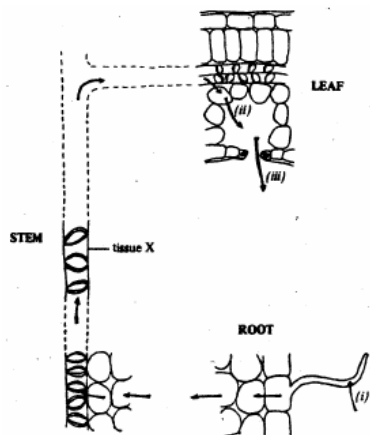
31. 2008/II/9

During the rainy season, the soil may be waterlogged for a long period of time. Some terrestrial plants may become wilted. Which of the following explanations is correct?

- A. The roots absorb more water as the soil water is diluted
- B. The roots absorb less water as less minerals are absorbed
- C. The roots absorb more minerals as there are more dissolved minerals
- D. The roots absorb less minerals as the minerals are washed away

1. 1990/II/23

Questions 1 and 2 refer to the diagram below which shows the pathway of water movement through different regions of a plant. The arrows in the diagram indicates the direction of water movement.



Which of the following combinations is correct?

	Process (I)	Process (II)	Process (III)
A.	diffusions	osmosis	diffusions
B.	osmosis	evaporation	diffusion
C.	diffusions	osmosis	evaporation
D.	osmosis	evaporation	evaporation

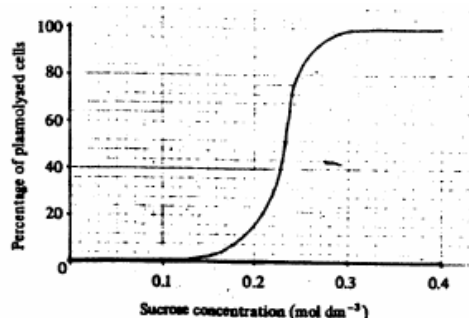
2. 1990/II/24

Which of the following are functions of tissue X?

- (1) for the treatment transport of sugar
 - (2) for the transport of water
 - (3) for the transport of mineral salts
 - (4) for support
- A. (1) and (4) B. (2) and (3) C. (1), (2) and (3) D. (2), (3) and (4)

3. 1990/II/28

Questions 3 and 4 refer to the graph below which shows the percentage of plasmolysed plant cells at different concentrations of sucrose solution :



The result suggests that the plant cell

- A. have cell saps of different concentrations B. have cell walls of different concentrations
C. are of different sizes D. are resistant to high sucrose concentrations

4. 1990/II/29

Which of the following correctly describes the condition of most of the plant cells at a sucrose concentration of 0.3 mol dm^{-3}

- A. crushed B. flaccid C. turgid D. burst

5. 1991/II/17

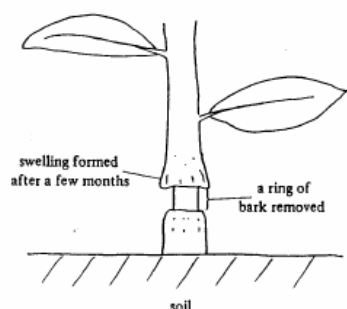
Leaves of the water lily floating on water have stomata found on

- A. the upper side only B. the lower side only C. both sides D. neither side

6. 1991/II/23

Questions 6 and 7 refer to ringing experiment. A woody plant had a ring of bark removed and left to grow again.

The diagram below shows the appearance of the plant after a few months:



The swelling may be due too

- (1) active cell division
(2) the accumulation of water
(3) the accumulation of food

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

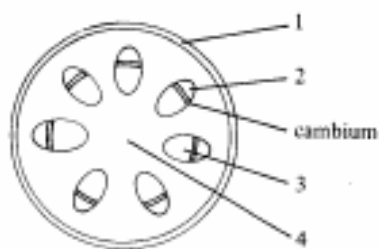
7. 1991/II/24

The plant may die eventually because

- | | |
|--|--|
| A. water could not reach the roots | B. water could not reach the stem and leaves |
| C. carbohydrates could not reach the roots | D. carbohydrates could not reach the leaves |

8. 1992/II/3

Questions 8 and 9 refer to the diagram below which shows a transverse section of a young dicotyledonous stem:



Which region is made up of cells with the thickest cell wall?

- A. 1 B. 2 C. 3 D. 4

9. 1992/II/4

Which region is responsible for the transport of organic nutrients?

- A. 1 B. 2 C. 3 D. 4

10. 1992/II/18 (*out of syll.*)

Which of the following is not a necessary precaution for a water culture experiment using young seedlings?

- A. cutting the shoot of the seedlings under water.
- B. covering the outer surfaces of the culture jars with black paper.
- C. blowing air onto the solutions daily.
- D. renewing the solutions every two weeks.

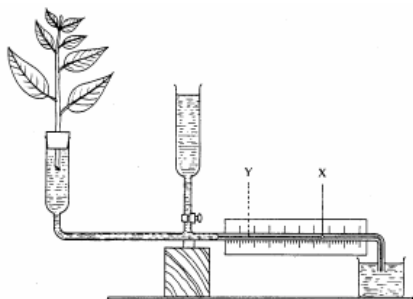
11. 1992/II/19 (*out of syll.*)

In a water culture experiment, seedlings are preferable to mature plants. The main reason is that

- | | |
|---|---|
| A. seedlings grow at a slower rate. | B. seedlings require less mineral nutrients. |
| C. seedlings fit into the culture jars more easily. | D. seedlings have little reserves of mineral salts. |

12. 1992/II/28

Questions 12 and 14 refer to the diagram below :



In setting up the potometer, the main reason for cutting the stem of the plant under water is to

- A. prevent air blocking the xylem vessels B. prevent soil particles blocking the xylem vessels
 C. allow water to enter the xylem vessels D. allow water to rise rapidly into the xylem vessels

13. 1992/II/29

The following results are obtained when the set-up is put under two different environmental conditions M and N :

Condition	Time for the air bubble to travel from X to Y (s)
M	15
N	10

Which of the following shows the likely environmental conditions of M and N?

Condition M**Condition N**

- | | |
|---------------------|----------------------|
| A. dry and windy | humid and still air |
| B. dry and sunny | humid and cloudy |
| C. windy and sunny | still air and cloudy |
| D. humid and cloudy | dry and sunny |

14. 1992/II/30

The table below shows the stomata densities in the leaves of two plants P and Q. What would be the most likely time for the air bubble to travel from X to Y, other environmental conditions being the same?

Plant	Number of stomata per cm ²	
	Upper epidermis	Lower epidermis
P	0	29 500
Q	4 000	28 000

Time for P (s)**Time for Q (s)**

- | | | |
|----|----|----|
| A. | 14 | 14 |
| B. | 17 | 11 |
| C. | 11 | 17 |
| D. | 0 | 14 |

A. they are similar in size. B. they have less food reserve.

C. they have a faster growth rate. D. they rely on cell turgidity for support.

A. osmosis in the root hair cells. B. capillary action in the xylem.
C. active transport in the phloem. D. evaporation from the mesophyll cells.

- A. The xylem in the shoots had been removed.
- B. The leaves of the shoots were mainly supported by turgid cells.
- C. Food in the leaves of shoot Y was transported away through the phloem.
- D. Water in the leaves of shoot Y moved to the dye solution by osmosis.

19. 1995/II/10

The diagram below shows a plant viewed from the top :



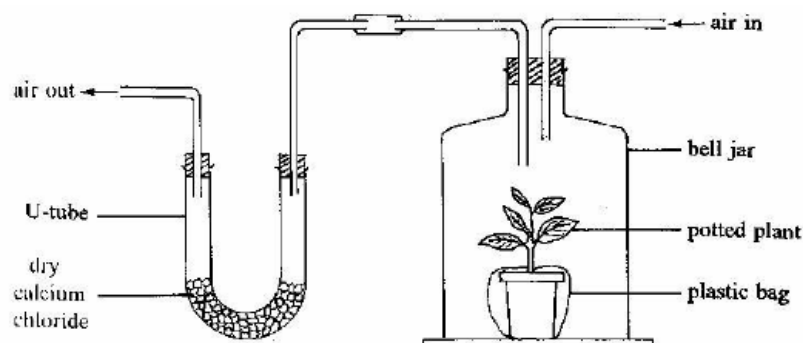
The leaves of the plant are so arranged in order to allow the leaves to

- A. have more space to grow. B. absorb the maximum of light.
C. spread out for the landing of insects D. absorb the maximum amount of rain water.

20. 1995/II/20

Question 20 and 21 refer to the diagram below which shows a set-up for measuring water loss from a plant.

The mass of the U-tube and its content was record at different times of the experiment.



Treatment	Time of measurement	Mass of the U-tube and its content (g)
1. Without plant in bell jar	At the beginning	100
	After one hour	105
2. With plant in bell jar	At the beginning	100
	After one hour	120

How much water is lost from the plant in one hour?

- A. 5 g B. 10 g C. 15 g D. 20 g

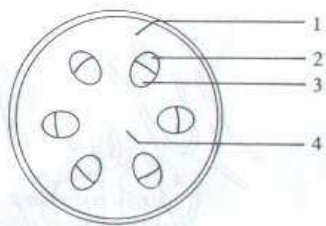
21. 1995/II/21

Which of the following changes would increase the rate of water loss from the plant inside the bell jar?

- A. decrease in light intensity B. decrease in air temperature
C. decrease in relative humidity D. decrease in the rate of air flow

22. 1995/II/28

Question 22 to 23 refer to the diagram below which shows a section of a certain part of a plant :



This section is taken from

- A. a young stem. B. a young root. C. a woody stem. D. a woody root.

23. 1995/II/29

Which regions provide support by cell turgidity?

- A. 1 and 2 B. 1 and 4 C. 2 and 3 D. 3 and 4

24. 1995/II/30

Which region is responsible for the transport of sugars?

- A. 1 B. 2 C. 3 D. 4

25. 1996/II/13

Stomata are usually absent from the submerged leaves of aquatic plants because

- A. there is no transpiration.
B. the epidermis of the leaves is poorly developed.
C. this can prevent water from entering the air spaces of the leaves.
D. gaseous exchange takes place through the whole leaf surface.

26. 1996/II/14

When a leaf is put in hot water, bubbles appear on the surface of the leaf. This is because

- A. the dissolved air in the water is released.
B. the air in the air spaces of the leaf expands.
C. the leaf produces a lot of oxygen by photosynthesis.
D. the leaf produces a lot of carbon dioxide by respiration.

27. 1996/II/16

Questions 27 and 28 refer to the following processes in green plants:

- (1) cell enlargement
- (2) breaking down glucose to release energy
- (3) producing organic food from inorganic substances

Water is used by the plants for

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

Which of the processes can occur in the absence of light?

29. 1996/11/24

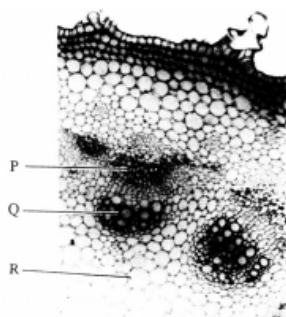
A. (1) only B. (1), (2) and (3) only C. (2), (3) and (4) only D. (1), (2), (3) and (4)

Food is usually stored in cell type

31. 1996/II/26

A. P B. Q C. R D. S

The photomicrograph below shows part of a section through a plant organ:



P

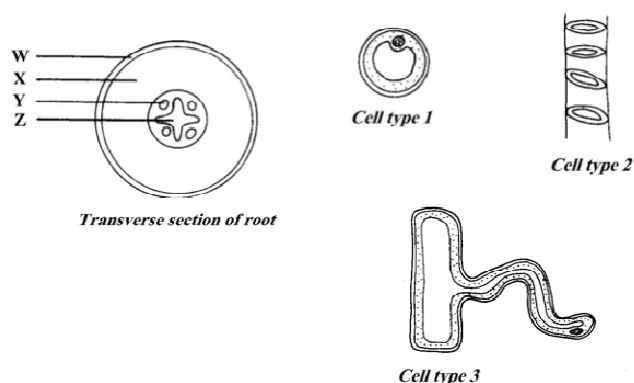
Q

R

- 87

33. 1997/II/23

Questions 33 and 34 refer to the diagrams below which show the transverse section of a young root and three types of cells found in it:



Which of the following correctly lists the location of the three types of cells?

	Cell type 1	Cell type 2	Cell type 3
A.	X	W	Z
B.	X	Z	W
C.	Y	Z	X
D.	Y	X	W

34. 1997/II/24

Which of the following correctly states the functions of W, X and Y?

	W	X	Y		W	X	Y
A.	absorption	transport	support	B.	protection	food storage	transport
C.	support	protection	food storage	D.	transport	support	protection

35. 1998/II/3

Which of the following allows a more accurate estimation of the density of stomata (number per unit area) of a leaf ?

- A. to view a transverse section of the leaf under a microscope at low power.
- B. to view a transverse section of the leaf under a microscope at high power.
- C. to view an epidermal peel of the leaf under a microscope at low power.
- D. to view an epidermal peel of the leaf under a microscope at high power.

36. 1998/II/21

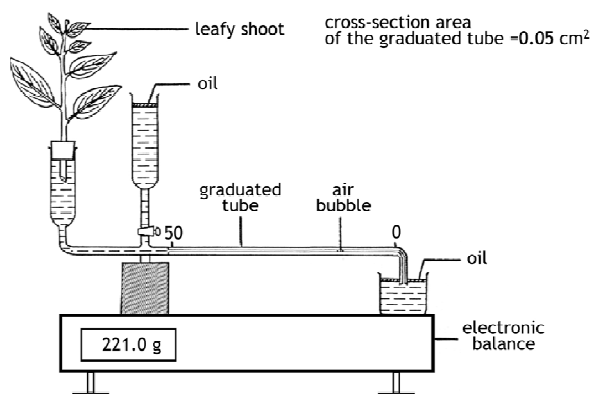
Food stored in seeds can be in form of

- (1) glycogen
- (2) oil
- (3) starch

- A. (1) only
- B. (3) only
- C. (1) and (2) only
- D. (2) and (3) only

37. 1998/II/22

Questions 37 to 39 refer to the diagram below which shows a set-up used to measure the rate of water absorption and transpiration of a leafy shoot :



The position of the air bubble and the weight of the set-up are shown in the table below :

	Initial reading	Reading after 30 minutes
Position of air bubble (cm)	5	15
Weight of set-up (g)	221.3	221.0

(1 cm³ of water weights 1 g)

How much water is retained by the shoot in 30 minutes?

- A. 0.1 g B. 0.2 g C. 0.3 g D. 0.5 g

38. 1998/II/23

What are the possible functions of water in plants?

- (1) as raw material for respiration
- (2) as raw material for photosynthesis
- (3) as a medium for food transport

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

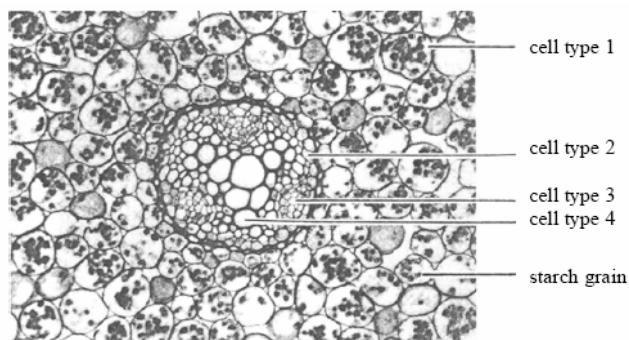
39. 1998/II/24

The distance moved by the bubble in 30 minutes is the greatest when the set-up is put under

- A. a humid, cold and bright condition. B. a humid, warm and dark condition.
C. a dry, cold and dark condition. D. a dry, warm and bright condition.

40. 1999/II/4

Questions 40 and 41 refer to the photomicrograph below, which shows part of a section of a young root :



Which type of cells cannot break down food to release energy?

- A. cell type 1 B. cell type 2 C. cell type 3 D. cell type 4

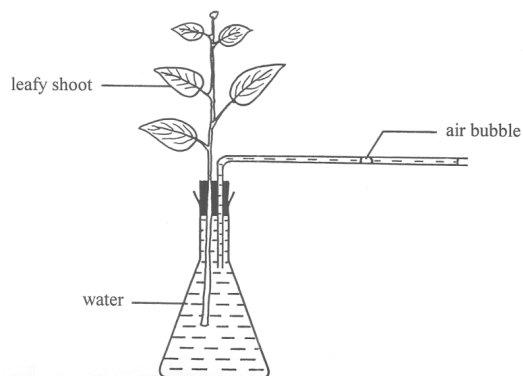
41. 1999/II/5

Which of the following correctly states the functions of cell types 1 and 4?

Cell type 1 **Cell type 4**

- A. photosynthesis food transport
 B. photosynthesis water transport
 C. food storage food transport
 D. food storage water transport

42. 1999/II/21

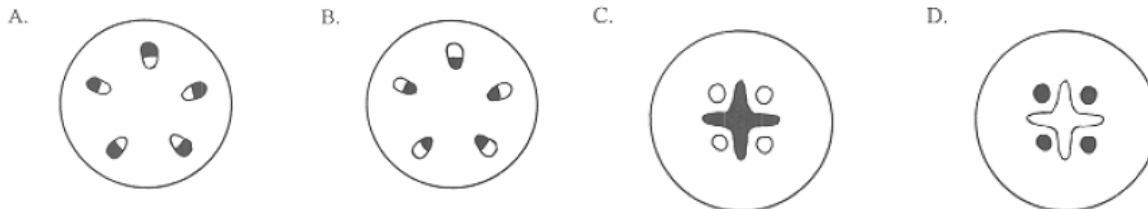


In the set-up above, the rate of movement of the air bubble measures

- A. the rate of osmosis. B. the rate of transpiration.
 C. the rate of active transport. D. the rate of water absorption.

43. 1999/II/29

Mary bought a bunch of blue flowers from the market. In order to find out whether the colour was artificially introduced or not, she prepared a section of the stem and observed it under the microscope. Which of the following correctly shows the condition of the section if the colour of the flowers was artificially introduced ?
(Key : ■ area stained blue)



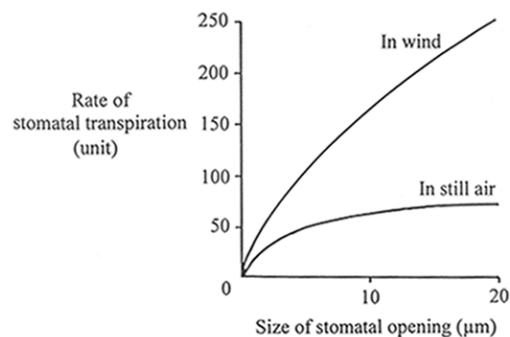
44. 2000/II/12

Which of the following processes requires energy from respiration?

- A. movement of water in xylem vessels caused by transpiration pull
- B. absorption of water by mesophyll cells from xylem vessels
- C. absorption of mineral salts by root hair cells
- D. water loss through the stomata of the leaf

45. 2000/II/14

The graph below shows the relationship between the rate of stomatal transpiration and the size of stomatal opening of a plant :

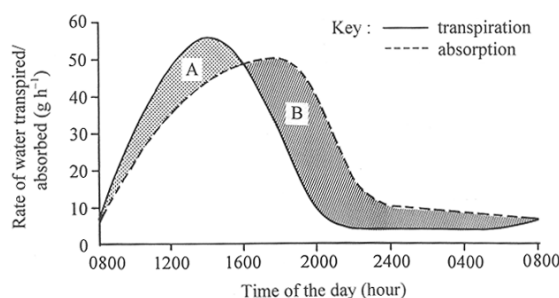


Which of the following can be concluded from the graph ?

- A. The stomata open wider under windy conditions.
- B. Air movement reduces the relative humidity of air.
- C. The wider the stomata, the higher the rate of transpiration.
- D. The rate of water absorption of the plant is lower in still air

46. 2000/II/17

Questions 46 to 48 refer to the graph below, which shows the rates of transpiration and water absorption of a plant for a period of 24 hours :



The change in transpiration rate of the plant from 0800 to 1400 hour was most likely caused by an increase in

- A. the rate of water absorption of the plant. B. the rate of photosynthesis of the plant.
C. air movement. D. air temperature.

47. 2000/II/18

The rate of water loss from the plant was higher than its rate of water uptake at

- A. 0800 hour. B. 1200 hour. C. 1600 hour. D. 2000 hour.

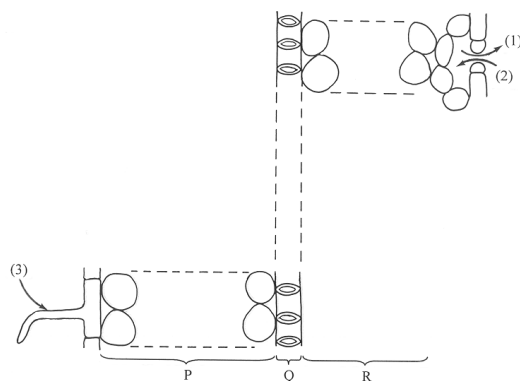
48. 2000/II/19

Area B was found to be greater than area A. A probable reason for this is that

- A. the relative humidity of air was high.
B. the plant could absorb moisture from the air.
C. new cells were formed by the plant during plant growth.
D. the respiration rate of the plant was higher than its photosynthetic rate.

49. 2000/II/30

Questions 49 and 50 refer to the diagram below, which is a diagrammatic representation of the root and the leaf of a plant :



The direction of oxygen diffusion between the plant and the surroundings under bright daylight is indicated by

- A. (1) only B. (2) only C. (1) and (3) only D. (2) and (3) only

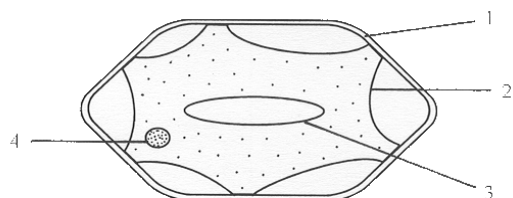
50. 2000/II/31

When the plant is deficient in water, which cell type(s) is/are important for supporting the plant ?

- A. Q only B. P and Q only C. P and R only D. P, Q and R

51. 2001/II/31

Questions 51 and 52 refer to the diagram below, which shows a cell in the lower epidermis of a leaf :

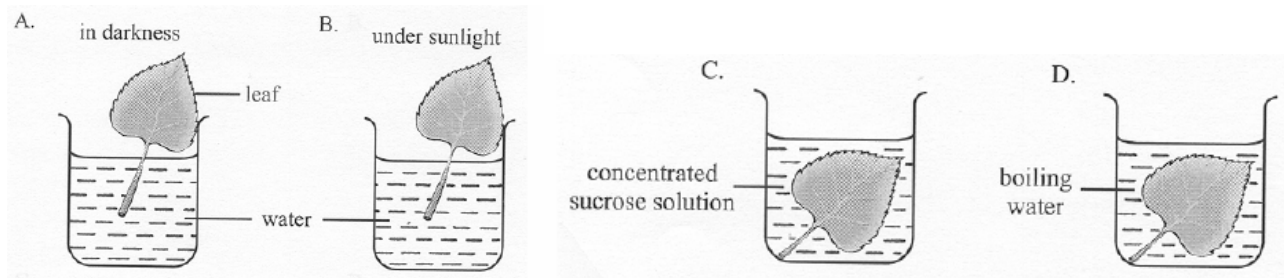


Which structure allows dissolved substances to pass through freely ?

- A. 1 B. 2 C. 3 D. 4

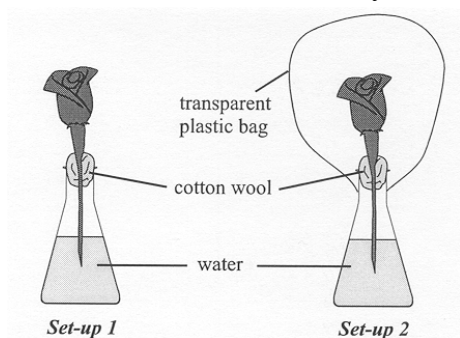
52. 2001/II/32

The lower epidermis was taken from a leaf that had been kept under one of the following conditions for 30 minutes. Under which condition was the leaf kept?



53. 2001/II/52

Questions 53 to 55 refer to the diagram below, which shows two experimental set-ups. Two shoots with flower buds were used and after two days, the buds in both shoots developed into flowers.



The mass of each shoot and the whole set-up were recorded at the beginning of the experiment and after two days. The table below shows the measurements taken :

	Mass at the beginning (g)		Mass after 2 days (g)	
	Whole set-up	Shoot	Whole set-up	Shoot
Set-up 1	182.41	5.75	179.10	7.29
Set-up 2	183.86	5.78	183.63	7.38

The change in mass of the whole set-up 1 during the experiment was mainly caused by

- A. respiration B. photosynthesis C. transpiration D. water absorption

54. 2001/II/53

The change in mass of the shoots during the experiment was due to

- A. growth B. respiration C. evaporation D. mineral absorption

55. 2001/II/54

Based on the results of this experiment, which of the following is a probable conclusion?

- A. Transpiration facilitates mineral absorption.
 B. Water gained by the shoot is increased by transpiration.
 C. The rate of photosynthesis is higher than the rate of respiration.
 D. The growth of the buds into flowers is not affected by transpiration.

56. 2002/II/4

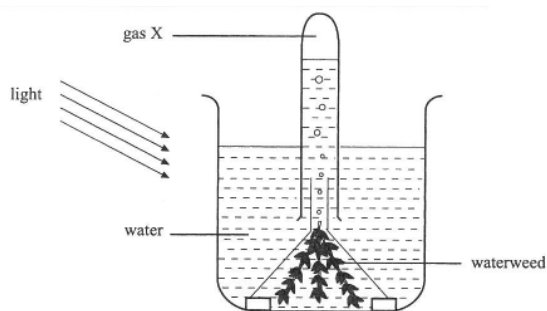
Which of the following correctly states the difference between a root hair cell and a mesophyll cell?

Root hair cell**Mesophyll cell**

- | | |
|-----------------------------|------------------------|
| A. dead cell | living cell |
| B. chlorophyll absent | chlorophyll present |
| C. can transport water | cannot transport water |
| D. not covered with cuticle | covered with cuticle |

57. 2002/II/5

Questions 57 and 58 refer to the set-up below, which is used to investigate the photosynthesis of a waterweed :



The waterweed produces gas X and starch from

- | | Gas X | Starch |
|----|----------------|--------------------------|
| A. | water | carbon dioxide |
| B. | water | carbon dioxide and water |
| C. | carbon dioxide | glucose |
| D. | carbon dioxide | carbon dioxide and water |

58. 2002/II/6

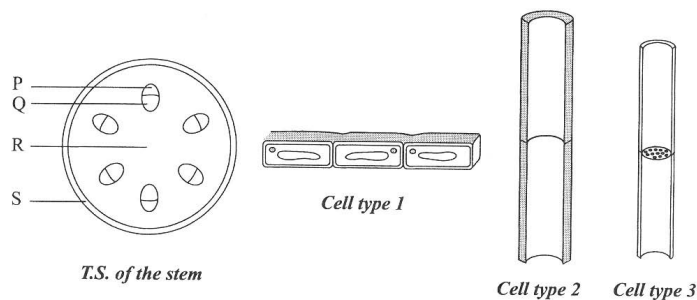
Arrange in the correct order the following steps for testing the presence of starch in the green leaves of the waterweed :

- (1) Add iodine solution.
- (2) Soak the leaves in warm water.
- (3) Boil the leaves in water for two minutes.
- (4) Immerse the leaves in alcohol heated in a hot water bath.

- A. (1), (2), (3), (4) B. (2), (4), (3), (1) C. (3), (4), (2), (1) D. (4), (1), (3), (2)

59. 2002/II/43

Questions 59 to 61 refer to the diagrams below, which show the transverse section of the stem of a young herbaceous plant and three types of cells found in it :



Which of the following correctly lists the location of the three types of cells in the stem ?

	Cell type 1	Cell type 2	Cell type 3
A.	R	P	Q
B.	S	P	Q
C.	R	Q	P
D.	S	Q	P

60. 2002/II/44

Which of the following comparisons between cell types 2 and 3 is incorrect?

Cell type 2	Cell type 3
A. dead cells	living cells
B. without end walls	with end walls
C. for transporting inorganic minerals	for transporting organic minerals
D. direction of transport is downwards	direction of transport is upwards

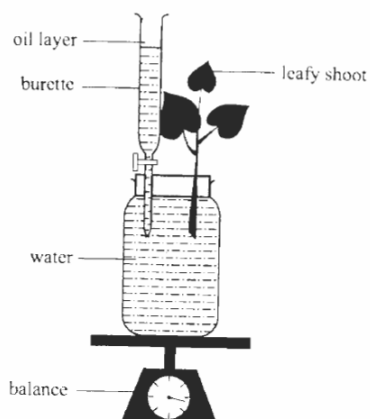
61. 2002/II/45

On a hot dry day, the young plant wilted and its stem bent. This is due to the loss of water from

- A. P B. Q C. R D. S

62. 2003/II/19

Questions 62 to 63 refer to the set-up below:



In order to find out the rate of water absorption of the leafy shoot, which of the following data are required?

- (1) duration of the study
- (2) total surface area of the leaves
- (3) change in the reading of the balance
- (4) change in the water level in the burette

A. (1) and (3) B. (1) and (4) C. (2) and (3) D. (2) and (4)

63. 2003/II/20

The change in the reading of the balance would be largest if the set-up is placed in

- A. a hot and bright condition
- B. a cold and humid condition
- C. a cool and dark condition
- D. a warm and still-air condition

64. 2004/II/4

A student examined the distribution of stomata in the leaves of three different plants: a land plant with broad leaves, a water plant with floating leaves and a water plant with submerged leaves. The results are shown below:

Plant	Stomatal density (number per mm^2)	
	Upper epidermis	Lower epidermis
P	30	0
Q	0	0
R	12	35

Which of the following correctly identifies the three plants?

Land plant Water plant with floating Water plant with submerged leaves

- A. P R Q
- B. Q P R
- C. R Q P
- D. R P Q

65. 2004/II/17

On a hot summer afternoon, the shoot of a herbaceous plant may become wilted for several hours and most stomata of its leaves are closed. What is the advantage of the stomatal closure to the wilted plant?

- A. to reduce the transpiration rate B. to reduce the rate of gaseous exchange
C. to cut down water absorption from the root D. to avoid further increase in leaf temperature

66. 2004/II/18

Refer to Question 65, the wilted plant usually restores its upright appearance in the late afternoon. This is because

- A. the stomata become opened B. the photosynthesis rate stops
C. the transpiration rate decreases D. the respiratory rate increases

67. 2004/II/46

Which of the following correctly compares the transport of substances in the xylem and phloem?

Transport in xylem**Transport in phloem**

- | | |
|---|---|
| A. occurs in dead cells | occurs in living cells |
| B. transports sugars | transports amino acids |
| C. occurs both day and night | occurs only at night |
| D. transports substances in two direction | transports substances in one direction only |

68. 2005/II/9

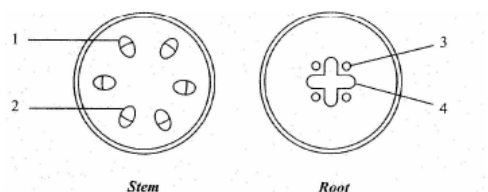
Which of the following correctly matches the cell types with their features?

Cell type**Feature**

- | | |
|-------------------------|-----------------------------------|
| (1) xylem vessel | tube-like cell with no nucleus |
| (2) mesophyll cell | thin-walled cell with chloroplast |
| (3) root epidermal cell | thin-walled cell with cuticle |
- A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

69. 2005/II/22

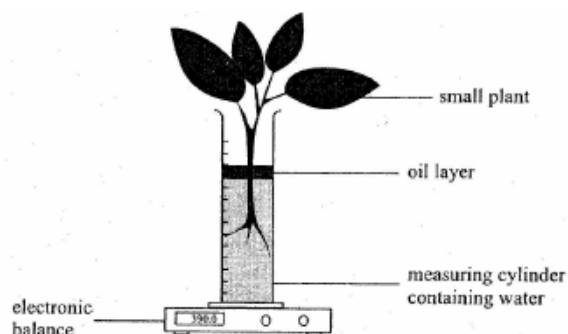
The root of a leafy plant was immersed in a red dye solution for several hours. Transverse sections of the stem and root were then prepared and examined under the microscope. Referring to the diagram below, which tissue of the stem and root would be stained red?



- | | Stem | Root | | Stem | Root |
|----|-------------|-------------|----|-------------|-------------|
| A. | 1 | 3 | B. | 1 | 4 |
| C. | 2 | 3 | D. | 2 | 4 |

70. 2005/II/47

Questions 70 to 71 refer to the set-up below: which is used to study the water balance of a small plant:



After 5 hours, the following results are recorded:

Change in reading of the electronic balance = p gram

Change in water level in the measuring cylinder = $q \text{ cm}^3$

Where p and q represent the magnitude of the change

(Given: mass of 1 cm^3 of water = 1 gram)

Which of the following represents the amount of water retained by the plant in 5 hours?

- A. p B. q C. $p - q$ D. $q - p$

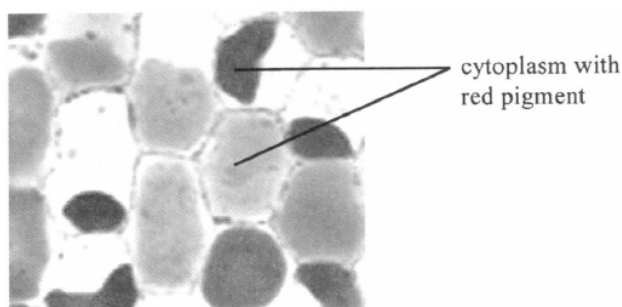
71. 2005/II/48

The value of p will be the highest when the set-up is put under

- A. a bright and windy condition B. a bright and humid condition
C. a dark and humid condition D. a dark and windy condition

72. 2006/II/28

The photomicrograph below shows the appearance of the epidermal cells of a plant after they have been immersed in sugar solution for an hour. The cytoplasm of the epidermal cells contains a red pigment. The colour intensity and distribution of pigment of different cells vary due to different rates of water loss.



The rate of water loss varies because

- A. the cells have just started to lose water and have not yet reached equilibrium
B. individual cells are located at different distances from the sugar solution
C. the cells have different water potentials
D. the cells have vacuole of different sizes

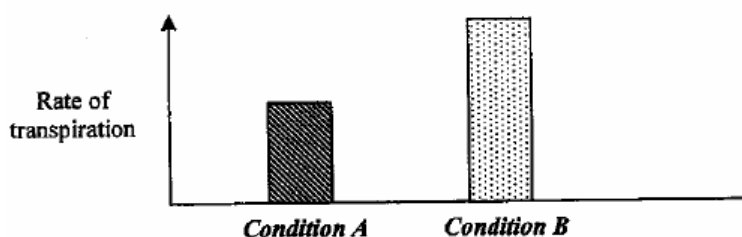
73. 2007/II/1

Which of the following correctly compares a leaf epidermal cell and a root hair cell of a flower plant?

- | Leaf epidermal cell | Root hair cell |
|----------------------------|-----------------------|
| A. with cuticle | without cuticle |
| B. with chloroplast | without chloroplast |
| C. without vacuole | with vacuole |
| D. without mitochondria | with mitochondria |

74. 2007/II/44

The graph below shows the transpiration rates of the same plant put under two different environmental conditions

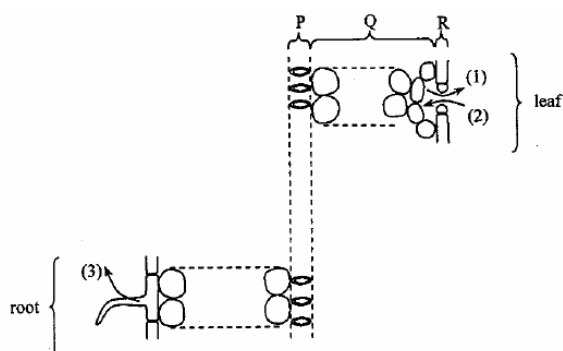


Which of the following is an unlikely combinations of the conditions being studied?

- | Condition A | Condition B |
|--------------------------------|-----------------------------|
| A. still air | moving air |
| B. air temperature is 15°C | air temperature is 25°C |
| C. relatively humidity 98% | relatively humidity 75% |
| D. 0.03% carbon dioxide in air | 0.01% carbon dioxide in air |

75. 2007/II/46

Questions 75 to 76 refer to the diagram below, which shows a diagrammatic representation of the root and the leaf of a herbaceous plant:



The direction of carbon dioxide diffusion between the plant and the surroundings under bright daylight is indicated by

- A. (1) B. (2) C. (1) and (3) D. (2) and (3)

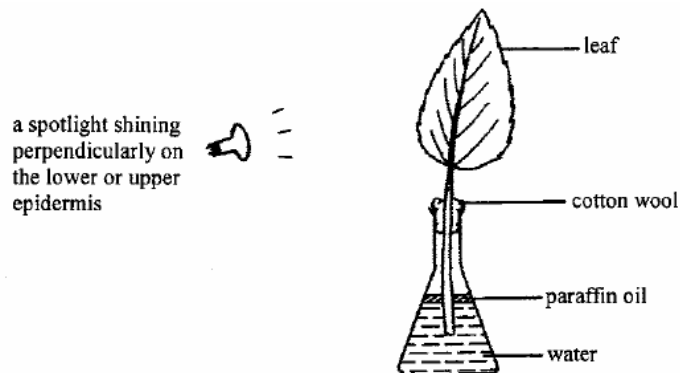
76. 2007/II/47

Which cell type(s) is/are important for supporting the plant?

- A. P B. P and Q C. Q and R D. P, Q and R

77. 2008/II/40

Questions 77 to 78 refer to the diagram below, which shows an investigation carried out under daylight condition using a leaf freshly removed from a terrestrial plant:



The initial mass of the set-up and its mass after one hour were measured. The results are shown in the table Below:

Treatment	Surface illuminated by spotlight	Initial mass (g)	Mass after 1 hour (g)
I	Lower epidermis	378.0	375.4
II	Upper epidermis	375.2	374.6

The change in the mass of the set-up during the experiment was mainly caused by

- A. photosynthesis B. respiration C. transpiration D. water absorption

78. 2008/II/41

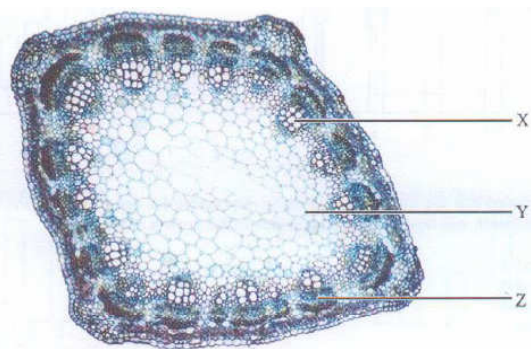
Which of the following account for the account for the results of the experiment?

- (1) The lower epidermis has more stomata than the upper epidermis
- (2) The photosynthesis rate in the treatment I is slower than that in treatment II
- (3) The temperature of the lower epidermis in treatment I is higher than that in treatment II

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

79. 2008/II/58

The photomicrograph below shows the cross section of a stem.

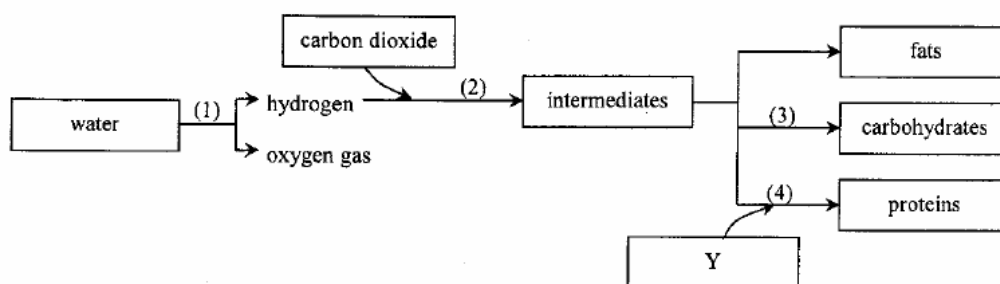


Which regions can provide support to the plant?

- A. X and Y B. X and Z C. Y and Z D. X, Y and Z

80. 2008/II/59

Questions 80 to 81 refer to the diagram below, which shows certain metabolic pathways that take place in a mesophyll cell:



Which of the following processes requires light energy?

- A. (1) B. (2) C. (3) D. (4)

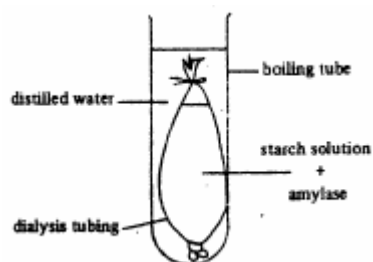
81. 2008/II/60

Which of the following statements concerning Y is correct?

- A. Y is water B. Y is nitrogen gas
C. Y are ammonium salts D. Y are hydrogencarbonate

1. 1990/II/4

Questions 1 and 2 refer to the diagram below which shows the experimental set-up used to demonstrate the importance of digestion in the absorption of food:



After one hour, small portions of distilled water in the boiling tube were separately tested using the Bluret test, iodine test and Benedict's test. The results were

	Bluret test	Iodine test	Benedict's test
A.	blue	brown	red precipitate
B.	blue	blue-black	red precipitate
C.	violet	brown	blue
D.	violet	blue-black	blue

2. 1990/II/5

Which of the following is a necessary precaution for this experiment?

- A. Put the experimental set-up in a water bath kept at 37°C.
- B. Stir the distilled water in the boiling tube occasionally.
- C. Shake the contents inside the dialysis tubing occasionally.
- D. Rinse the outside of the dialysis tubing with distilled water before putting it into the boiling tube.

3. 1990/II/6

In a starving mammal, the food reserves in the body will be depleted for energy release according to the following sequence:

- A. carbohydrates, proteins, fats
- B. carbohydrates, fats, proteins
- C. fats, carbohydrates, proteins
- D. fats, proteins, carbohydrates

4. 1990/II/35

Which of the following fluids collected from healthy person gives a red precipitate when tested with Benedict's solution?

- A. urine
- B. serum
- C. saliva
- D. gastric juice

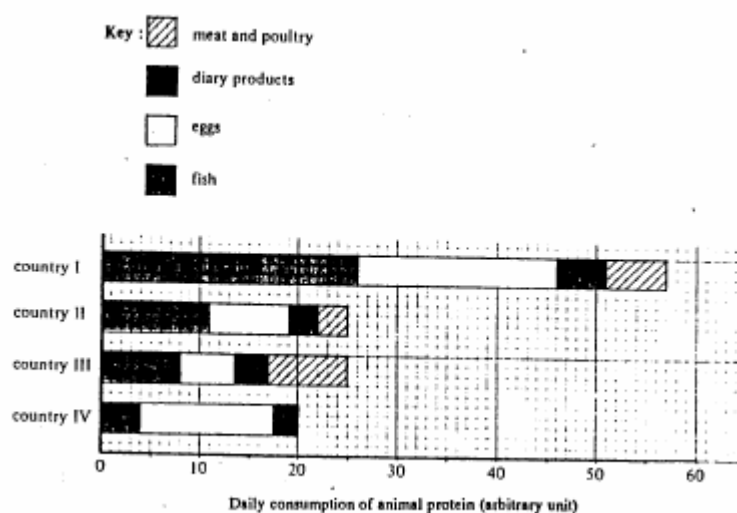
5. 1991/II/10

Which of the following combinations is INCORRECT?

Deficiency of	Disease
A. iron	goitre
B. vitamin B	beri-beri
C. calcium	rickets
D. vitamin C	scurvy

6. 1991/II/11

Questions 6 and 7 refer to the bar chart below which shows the daily consumption of animal protein by people of 4 countries.



The daily consumption of fish protein is the greatest in

- A. country I B. country II C. country III D. country IV

7. 1991/II/12

In which country, do dairy products make up the largest proportion of animal protein in the diet of the people?

- A. country I B. country II C. country III D. country IV

8. 1991/II/13

Which of the following foods provides the greatest amount of protein per unit mass?

- A. spinach B. potatoes C. mushrooms D. soya beans





9. 1992/II/12

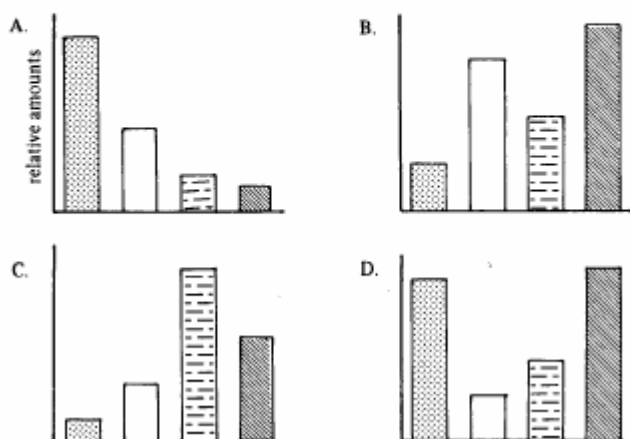
Which of the following groups of food has the greatest energy value?

	Carbohydrate (g)	Fat (g)	Protein (g)	Water (g)
A.	80	50	50	120
B.	80	60	50	110
C.	100	60	40	100
D.	120	30	50	100

10. 1992/II/17

The following bar charts show the relative amounts of certain food substances taken in daily by 4 different persons. Which person is least likely to suffer from rickets?

Key :  vitamin C
 vitamin D
 iodine
 calcium



11. 1993/II/14

The table below shows the amount of certain food substances present in 100g of each of three kinds of food X, Y and Z:

	Food X	Food Y	Food Z
Protein (g)	8.3	14.8	3.3
Carbohydrate (g)	55.5	0.01	4.8
Fats (g)	1.7	28.2	3.8
Minerals (mg)	103	14.0	122

Which of the following correctly identifies the three kinds of food?

	Food X	Food Y	Food Z		Food X	Food Y	Food Z
A.	beef	bread	milk	B.	bread	beef	milk
C.	beef	milk	bread	D.	bread	milk	beef

12. 1993/II/22 (*This item was deleted*)

The table below shows the daily requirements of certain nutrients and energy for four different types of people, namely 2-year-old-children, 34-year-old man labourers, 25-year-old females and pregnant woman:

	Daily requirements			
	Protein (g)	Vitamin D (mg)	Calcium (mg)	Energy (kJ)
A	90	0.0025	500	15100
B	60	0.01	1200	10000
C	44	0.005	500	8400
D	35	0.01	500	5900

Which row of information describes the daily requirements for the 2-year-old children?

- A. A B. B C. C D. D

13. 1994/II/9

Questions 13 and 14 refer to the table below which shows the composition of food substances in four vegetables:

	Water (g)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (mg)	*Carotene (mg)	Vitamin C (mg)
Potato (100 g)	79	1.9	0.7	16	11	0.01	18
Soya bean (100 g)	70	13.6	5.7	7	100	0.28	25
Spinach (100 g)	93	2.0	0.2	2	70	2.96	31
Green pepper (100 g)	93	0.9	0	5	7	1.56	105

* Carotene can be converted to vitamin A in the human body.

Vivian, a 6-year-old girl, does not have meat or milk in her diet.

Which of the vegetables listed in the table is most important for her growth?

- A. potato B. soya bean C. spinach D. green pepper

14. 1994/II/10

If Vivian has bleeding gums, which vegetable is most effective in helping her to recover?

- A. potato B. soya bean C. spinach D. green pepper

15. 1995/II/9

The table below shows the result of an experiment to compare the amount of vitamin C in four fruit juices P, Q, R and S :

Fruit	Number of drops used to decolorizes 1 cm ³ of DIPIP
P	20
Q	24
R	40
S	28

Which fruit juice has the highest vitamin C concentration?

- A. P B. Q C. R D. S

16. 1995/II/13

Poor vision in dim light could be prevented by taking an adequate amount of

- A. beef. B. liver. C. fresh fruits D. potatoes.

17. 1996/II/3

Questions 17 and 18 refer to the information below:

Food tests were carried out on a certain kind of drink. The results are as follows:

	DCPIP test	Biuret test	Benedict's test
Result of the test	colourless solution	blue solution	blue solution

What can be concluded from the results?

- A. The drink contains proteins. B. The drink contains vitamin C.
C. The drink contains protein and reducing sugar. D. The drink contains vitamin C and reducing sugar.

18. 1996/II/4

A patient is recommended to take this drink regularly as a treatment. What disease might he suffer from?

- A. anaemia B. diabetes C. night-blindness D. scurvy

19. 1996/II/5

Vegetarians mainly eat plant products. Compare to a diet with meat, a vegetarian diet of the same mass contains

- (1) less fat
(2) more protein
(3) more dietary fibre

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

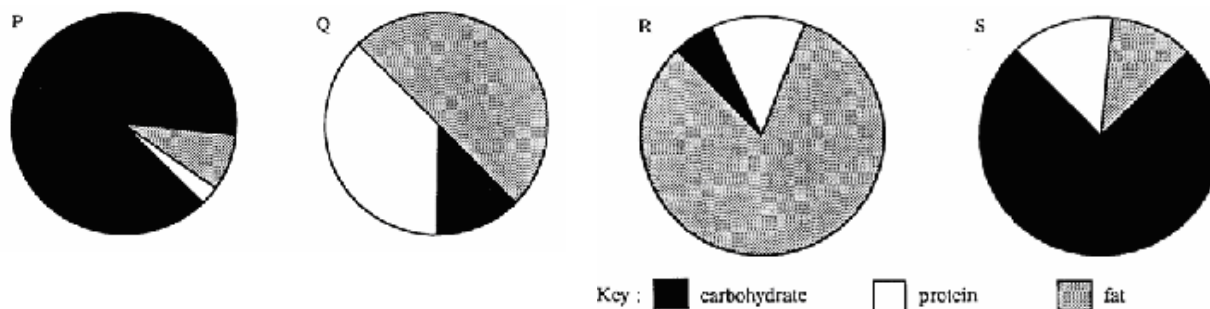
20. 1996/II/6

Which of the following is not an essential component of the human diet?

- A. calcium salts B. fat C. nitrates D. water

21. 1996/II/7

Questions 21 and 22 refer to the pie charts below which show the proportions of carbohydrates, fat and protein in four kinds of diet:



What diet provides the greatest amount of energy per unit mass?

- A. P B. Q C. R D. S

22. 1996/II/8

Which is a balanced diet?

- A. P B. Q C. R D. S

23. 1996/II/12

In Hong Kong, many school children are overweight because they

- (1) eat a lot of vegetables
- (2) eat a lot of sugary food
- (3) do little sport

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

24. 1996/II/28

The blood of a person takes a long time to clot. He may not have enough

- A. iron B. vitamin D C. antibodies D. blood platelets

25. 1998/II/6

Obesity (being very fat) may lead to the following except

- A. diabetes B. liver cancer C. high blood pressure D. coronary heart disease

26. 1998/II/7

Questions 26 and 27 refer to the table below which shows the composition of food substances in four vegetable :

	Carbohydrate (g)	Fat (g)	Protein (g)	Calcium (mg)	*Carotene (mg)	Vitamin C (mg)
Broad bean (100 g)	12	0.7	9.0	15	0.15	12
Potato (100 g)	16	0.7	1.9	11	0.01	18
Spinach (100 g)	2	0.2	2.0	70	2.96	31
Green pepper (100 g)	5	0	0.9	7	1.56	105

* Carotene can be converted to vitamin A in the human body.

Which vegetable listed above has the highest energy value?

- A. broad bean B. potato C. spinach D. green pepper

27. 1998/II/8

A person has normal vision in bright conditions but cannot see clearly in dim light. Which vegetable listed above is most effective in helping him to overcome the problem?

- A. broad bean B. potato C. spinach D. green pepper

28. 1999/II/10

Questions 28 and 29 refer to the following diagram of a set-up used to estimate the energy value of two types of food : The table below shows the results obtained :

Type of food	Mass of food used (g)	Initial water temperature(°C)	Final water temperature (°C)
Sugar	3	20	60
X	2	20	73

Food X is most likely to be

- A. rice. B. bean. C. butter. D. milk powder.

29. 1999/II/11

Which of the following are the possible sources of error in estimating the energy value of food by using the above set-up?

- (1) Heat is lost to the surroundings.
- (2) The food is not burnt completely.
- (3) The mass of food used is not the same.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

30. 1999/II/12

Which of the following food substances is not usually found in pork, milk and egg?

- A. fat B. protein C. dietary fibre D. mineral salt

31. 1999/II/17

In order to have healthy growth of teeth, the diet of young children should contain sufficient amounts of

- (1) calcium.
- (2) iron.
- (3) vitamin D.

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

32. 2001/II/7

A student mixed a 0.1% amylase solution with a 1% starch solution. He performed a number of food tests on the mixture immediately after mixing and obtained the following results :

Iodine test	Biuret test	Benedict's test
+	+	—

Key : + positive result
— negative result

If he repeated the food tests on the mixture 10 minutes later, what would be the possible results?

Iodine test Biuret test Benedict's test

- A. + + +
- B. — + —
- C. — — +
- D. + — —

33. 2001/II/9

Questions 35 and 36 refer to the table below, which shows the composition of 150 g each of four kinds of food :

Food	Protein (g)	Carbohydrate (g)	Fat (g)	Calcium (mg)	Iron (mg)	Vitamin A (mg)	Vitamin C (mg)
W	40	30	30	324	18	0.03	4.3
X	50	10	40	974	6	0.01	1.9
Y	30	10	60	226	3	0.09	1.5
Z	20	60	20	181	1	0.16	0.2

Which food has the highest energy value?

- A. W B. X C. Y D. Z

34. 2001/II/10

The haemoglobin content of a person's blood is found to be lower than normal. Which food would be most effective in helping the person to improve this condition ?

- A.W B. X C. Y D. Z

35. 2001/II/57

A person's blood takes a long time to clot. This may be due to a diet lacking in

- A. iron B. calcium C. vitamin A D. vitamin C

36. 2002/II/10

For overweight people, beans are better than eggs and meat as sources of protein because beans contain

- A. less fat. B. more iron. C. more amino acids. D. less dietary fibre.

37. 2002/II/12

Apples are good for our health because they provide

- (1) vitamins.
(2) minerals.
(3) dietary fibre.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

38. 2003/II/6

When a drop of liquid food was added to a piece of filter paper, a translucent spot appeared and remained after drying. What further step should be carried out in order to determine whether the food contains fat?

- A. Rinse the spot with alcohol B. Put the paper under sunlight
C. Heat the paper over a watch bath D. Observe the spot again after 30 minutes

39. 2003/II/12

Given a solution containing starch, lipase and glucose, which of the following tests will give a negative result with this solution?

- A. Benedict's test B. Biuret test C. Emulsion test D. Iodine test

40. 2003/II/15

Some old people suffer from a condition known as osteoporosis in which their bones become porous and brittle. This is due to the loss of a large amount of

- A. iron B. calcium C. vitamin C D. vitamin D

41. 2003/II/16

If a person suffers from night-blindness and constipation, which of the following foods is most effective for treating these disorders?

- A. ham B. liver C. carrot D. whole meal bread

42. 2003/II/32

A balanced diet helps to prevent

- A. AIDS B. anemia C. food poisoning D. colour-blindness

43. 2004/II/12

The diet of many children contains only a small amount of fruit and vegetables. This may lead to

- A. anaemia B. constipation C. night-blindness D. rickets

44. 2004/II/31

Man and woman differ in their dietary requirement of iron. This is because

- A. man needs more red blood cells.
- B. man can store more iron in his liver.
- C. woman loses blood in the menstrual flow.
- D. the red blood cells of woman have a shorter life span.

45. 2004/II/32

A woman's dietary requirement of calcium increases

- A. during menstruation.
- B. in the first week of pregnancy.
- C. at the onset of labour.
- D. during the breast-feeding period.

46. 2005/II/4

Eskimos are a people living in the arctic regions. Their diet is rich in fat because

- A. fat is a good insulator of heat.
- B. they hunt polar animals for food.
- C. fat has a higher energy value than carbohydrates.
- D. their alimentary canal is adapted for digesting fat.

47. 2005/II/32

Some woman have to take pills containing iron during pregnancy. The purpose is

- A. to replace the iron lost during menstruation.
- B. to ensure the mother's milk contains is enough.
- C. to supply iron for the development of the foetal skeleton.
- D. to provide iron for the formation of foetal red blood cells.

48. 2007/II/36

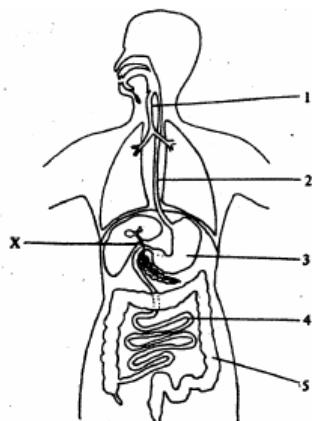
Dietary fibre and calcium in diet are important to primary school students because

- (1) food rich in calcium can help the formation and growth of bones and teeth
- (2) food with a high fibre content can reduce the risk of heart disease
- (3) food with a high fibre content can give a sense of fullness and help avoid over-eating

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1),(2) and (3)

1. 1990/II/7

Questions 1 to 3 refer to the diagram which shows some internal structures of the human body:



Which region(s) is/are lined with muscles?

- A. 1 B. 1 and 3 C. 2, 3 and 4 D. 1, 2, 3, 4 and 5

2. 1990/II/8

Which region has absorbs most water from its contents?

- A. region 2 B. region 3 C. region 4 D. region 5

3. 1990/II/9

The juice collected from duct X is boiled and then added to the following test-tubes:

Tube 1: containing water with a few drops of peanut oil

Tube 2: containing water with small cubes of egg white

Tube 3: containing water with a few grains of rice

Which tube, on shaking, will form an emulsion which will persist when left to stand?

- A. Tube 1 B. Tube 2 C. Tube 3 D. None of the above tubes

4. 1990/II/10

Which of the following statements about a dental dislocation agent is correct?

- A. It kills bacteria B. It contains fluoride
C. It has an abrasive effect D. It stains dental plaque red

5. 1991/II/15

Bile juice helps the digestion of fat because it contains

- A. enzymes B. vitamins C. bile salts D. bile pigments

6. 1992/II/14

Bacteria play a part in tooth decay by

- A. neutralizing the acidity of the saliva B. causing a foul smell in the mouth cavity
B. dissolving the enamel of the tooth D. converting the food trapped between the teeth into acid

7. 1992/II/15

Which of the following animals does not process canine teeth?

- A. the cat B. man C. the tiger D. the rabbit

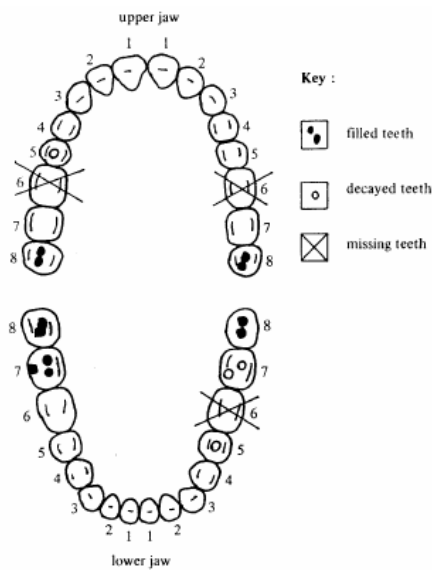
8. 1992/II/16

Which of the following products of digestion is absorbed into the lacteal of the villus?

- A. glucose B. glycogen C. fatty acids D. amino acids

9. 1993/II/12

Questions 9 to 10 refer to the dental chart of an adult as shown below:



The teeth labeled 3 in the dental chart are

- A. incisors B. canines C. premolars D. molars

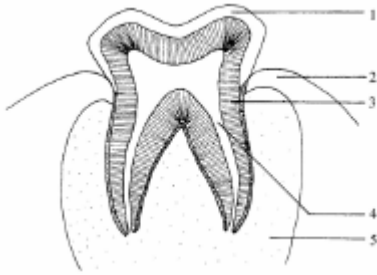
10. 1993/II/13

Which of the following conclusions can be drawn by referring only to the dental chart shown on the above diagram?

- A. Rear teeth have thinner enamel
 B. Frontal teeth are more resistant to decay
 C. Most of the tooth decay occurs in the rear part of the tooth set
 D. Tooth decay occurs randomly in different parts of the tooth set

11. 1994/II/3

Questions 11 and 12 refer to the diagram below which shows a vertical section of a human tooth in the jaw:



Which structures contain a large amount of calcium salts?

- A. 1, 2 and 3 only B. 1, 3 and 4 only C. 1, 3 and 5 only D. 2, 4 and 5 only

12. 1994/II/4

Which of the following structures has a rich supply of nerve endings?

- A. 1 B. 3 C. 4 D. 5

13. 1994/II/5

In an operation, a large part of the colon of a person was removed. As a result, the person could not

- A. take in solid food. B. produce sufficient digestive enzymes.
C. absorb amino acids efficiently. D. produce solid faeces.

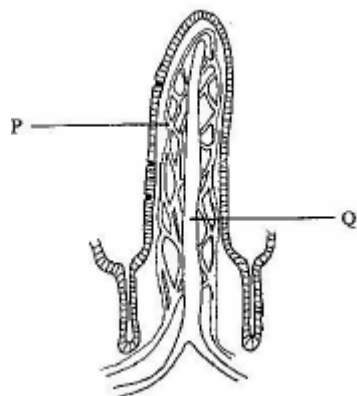
14. 1994/II/6

When bile juice is added to a sample of oil containing a few drops of universal indicator solution, the colour change indicates an increase in pH. The pH increases because

- A. bile juice contains bile pigments. B. bile juice contains alkaline salts.
C. bile juice emulsifies the oil. D. bile juice breaks down the oil into fatty acids.

15. 1995/II/14

Questions 15 to 17 refer to the diagram below which shows a section through a villus:



Which of the following are the functions of structure P?

- (1) It transports fat away.
- (2) It transports glucose and amino acids away.
- (3) It transports oxygen to the cells.

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3).

16. 1995/II/15

Structure P receives blood from

A. the aorta. B. the lymph vessel. C. the hepatic artery. D. the hepatic portal vein.

17. 1995/II/16

The fluid in Q

- A. contains antibodies
- B. is milky during fasting
- C. is rich in glucose after a meal
- D. contains a large amount of oxygen

18. 1997/II/5

Which of the following processes in the human body does not involve enzymes?

- A. oxidation of glucose in cells
- B. formation of urea in the liver
- C. emulsification of oil in the duodenum
- D. conversion of glucose into glycogen in the liver

19. 1997/II/10

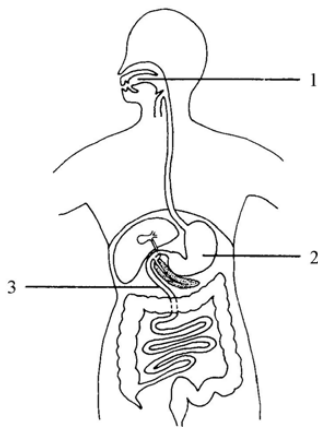
The diagrams below show two types of teeth of an adult man. Which of the following statements about the teeth is incorrect?



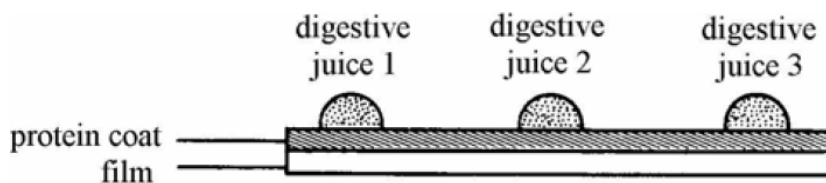
- A. The surface material of region M prevents the teeth from decay.
- B. Plaque is usually formed on the surface of region N.
- C. Tooth X is used for cutting food while tooth Y is for grinding food.
- D. Tooth X is located at the front of the jaw while tooth Y is located at the back.

20. 1997/II/11

Questions 20 to 22 refer to the diagram below which shows the human digestive system :



Digestive juices 1, 2 and 3 were collected from structures 1, 2 and 3 respectively. Small drops of these juices were put on a strip of film which was coated with protein as shown in the diagram below :



The protein coat will be digested by the digestive juices

- A. 1 and 2 only
- B. 1 and 3 only
- C. 2 and 3 only
- D. 1, 2 and 3.

21. 1997/II/12

If the digestive juices in question 20 were mixed with a buffer solution of pH 2 before putting them on the film, then the protein coat

- A. would be digested at a slower rate by juice 1.
- B. would be digested by juice 2 only.
- C. would be digested at a faster rate by juice 3.
- D. would not be digested at all.

22. 1997/II/13 (*This item was deleted.*)

Mechanical digestion occurs in structures

- A. 1 and 2 only. B. 1 and 3 only. C. 2 and 3 only. D. 1, 2 and 3.

23. 1998/II/5

The stomach wall produces mucus to cover its surface. Which of the following statements correctly describe(s) the function of the mucus?

- (1) It kills the bacteria in the ingested food.
 (2) It prevents the rubbing of food against the stomach wall.
 (3) It protects the stomach wall from the action of the digestive enzymes.

- A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

24. 1998/II/9

Which of the following is most effective in preventing tooth decay?

- A. using a toothbrush with a large head B. Brushing the teeth after meals
 C. Brushing the teeth harder D. Avoiding sugary food

25. 1998/II/10

Which of the following statements about the function of the different ingredients of a toothpaste is correct?

- (1) It contains calcium compounds for the growth of the teeth.
 (2) It contains fluoride compounds for protecting the teeth from decay.
 (3) It contains grinding particles for removing plaque on the tooth surface.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

26. 1998/II/34

Which of the following combinations are correct?

Gland	Substance produced	Site of action of the substance
A. pancreas	insulin	muscle
B. seminal vesicle	sex hormone	penis
C. liver	bile salts	gall bladder
D. salivary gland	amylase	stomach

27. 1999/II/14

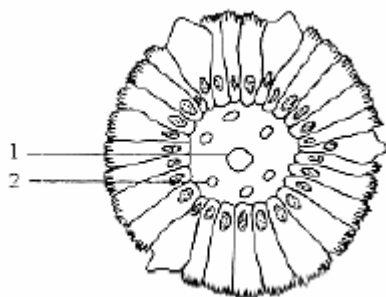
If the diet of a person is rich in carbohydrate, his body will store the excess carbohydrate as

- (1) fat.
 (2) starch.
 (3) glycogen.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

28. 1999/II/15

Questions 28 and 29 refer to the diagram below, which shows the transverse section of an intestinal villus :



The main food substance absorbed into structure 1 is

- A. fatty acids. B. vitamins. C. glucose. D. fat.

29. 1999/II/16

Food substances absorbed into structure 2 will be first transported to

- A. the liver. B. the heart. C. the kidneys. D. the pancreas.

30. 1999/II/20

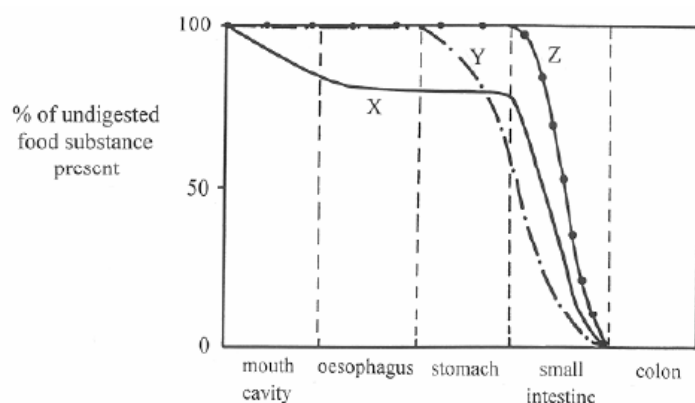
In the liver, excess amino acids will be converted into

- (1) urea.
(2) protein.
(3) carbohydrate.

- A. (1) only B. (2) only C. (1) and (3) only D. (2) and (3) only

31. 2000/II/6

Questions 31 to 33 refer to the graph below, which shows the digestion of three types of food substances, X, Y and Z, along the alimentary canal:



Which food substance(s) is/are digested in the stomach?

- A. X only B. Y only C. X and Y only D. X, Y and Z

32. 2000/II/7

What are food substances X, Y and Z?

- | | X | Y | Z |
|----|---------|---------|---------|
| A. | starch | protein | fat |
| B. | starch | fat | protein |
| C. | protein | fat | starch |
| D. | protein | starch | fat |

33. 2000/II/8

In the alimentary canal, most water is absorbed in the

- A. oesophagus B. stomach C. small intestine D. colon

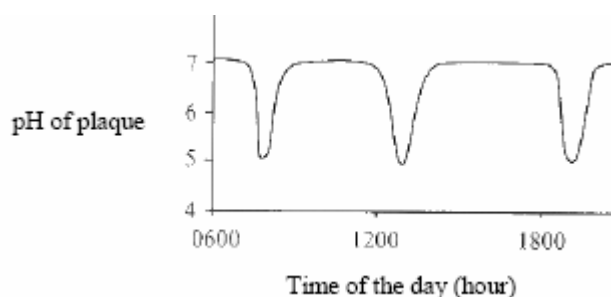
34. 2001/II/12

The absorption of water in the small intestine is facilitated by

- (1) the presence of numerous capillaries.
 (2) the absorption of digested food.
 (3) the folding of the inner lining.
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

35. 2001/II/14

The graph below shows the changes in pH of the plaque on the tooth surface of a child :



The change in pH from 12:00 to 12:30 hour is most probably caused by

- A. the destruction of the enamel by bacteria. B. the bacteria reacting with the food debris.
 C. the release of saliva into the mouth cavity. D. the breakdown of the food debris by bacteria.

36. 2001/II/17

Which of the following are excretory wastes produced by the liver?

- (1) urea
 (2) bile salts
 (3) carbon dioxide
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

37. 2002/II/8

Which of the following is not a normal component of the faeces of a healthy person?

- A. urea B. cells C. bacteria D. bile pigments

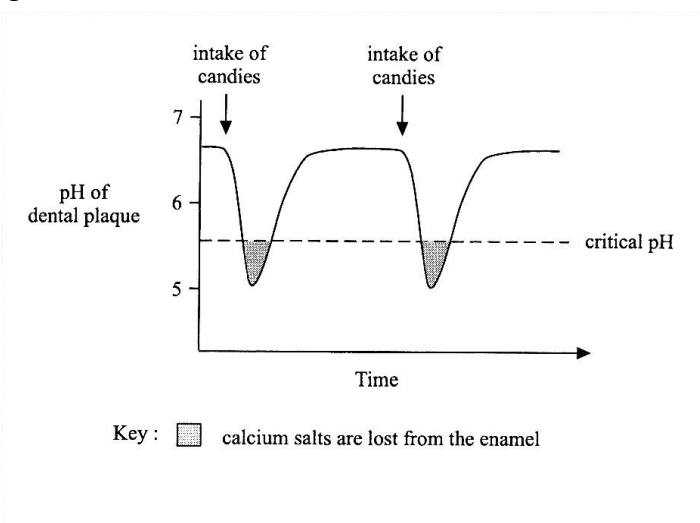
38. 2002/II/14

The liver is regarded as a digestive gland because it

- A. converts stored glycogen into glucose. B. breaks down excess amino acids.
C. produces bile. D. stores iron.

39. 2002/II/15

Questions 39 to 41 refer to the graph below, which shows the changes in pH of the dental plaque of a person after he has eaten some candies :



Calcium salts are lost from the enamel as a result of their reaction with

- A. acid. B. sugar. C. bacteria. D. salivary amylase.

40. 2002/II/16

Which of the following statements about the critical pH is correct?

- A. It is the pH of the candies.
B. It is the normal pH of the dental plaque.
C. It is the optimum pH for tooth decay to occur.
D. It is the pH below which tooth decay may occur.

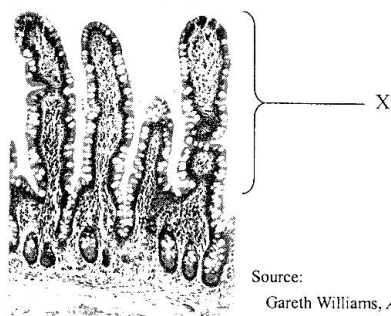
41. 2002/II/17

According to the graph, which of the following can help to prevent tooth decay?

- (1) reducing the frequency of eating sugary food
(2) adding fluoride to drinking water
(3) brushing our teeth after eating
A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

42. 2002/II/23

The photomicrograph below shows part of a human organ :



Source:
Gareth Williams, *Advanced Biology for you*,
Cheltenham: Stanley Thornes Publishers Ltd.,
2000.

The function of structure X is to

- A. detect light on the retina
- B. move the ovum along the oviduct
- C. reabsorb glucose in the kidney tubule
- D. absorb digested food in the alimentary canal

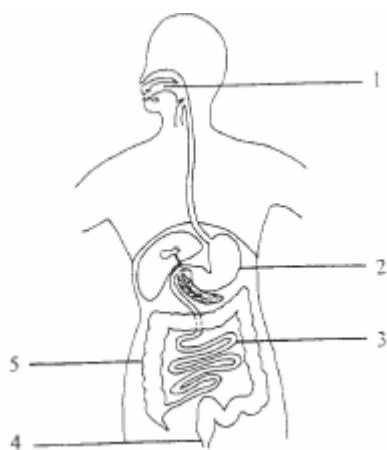
43. 2003/II/2

Which of the following is an adaptation of the tapeworm for living in the ileum of humans?

- A. It has no alimentary canal
- B. It uses hooks for breaking down food
- C. It does not need to oxidize food to release energy
- D. It has a large body surface for the food absorption

44. 2003/II/4

Questions 44 to 45 refer to the diagram below, which shows the human digestive system:



Protein digestion occurs mainly in

- A. 1 and 3
- B. 2 and 3
- C. 2 and 5
- D. 3 and 5

45. 2003/II/5

Most mineral salts are absorbed in

- A. 2
- B. 3
- C. 4
- D. 5

46. 2003/II/13

Most of the fat absorbed in the small intestine is first transported to the

- A. liver B. heart C. pancreas D. larger intestine

47. 2003/II/14

Frequent intake of candies causes tooth decay because

- (1) they are rich in sugar
(2) they have a high energy value
(3) they leave traces on the tooth surface

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

48. 2003/II/26

Which of the following correctly describes the emulsification of oil by bile?

- A. It produces fatty acids B. Its rate is highest at 37°C
C. It occurs in the gall bladder D. It increase the surface area of the oil

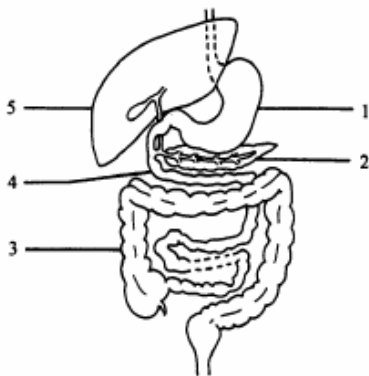
49. 2004/II/5

The fluid inside the lacteals of the intestinal villi becomes milky after a meal. This is due to the presence of

- A. fatty acids B. amino acids C. fats D. proteins

50. 2004/II/20

Questions 50 to 52 refer to the diagram below, which shows part of the human digestive system:



Which structure produces enzymes for digesting proteins in the alimentary canal?

- A. 1, 2 and 4 B. 1, 2 and 5 C. 1, 3 and 5 D. 2, 4 and 5

51. 2004/II/21

Which structures are responsible for the regulation of blood glucose level?

- A. 2 and 4 B. 2 and 5 C. 4 and 5 D. 2, 4 and 5

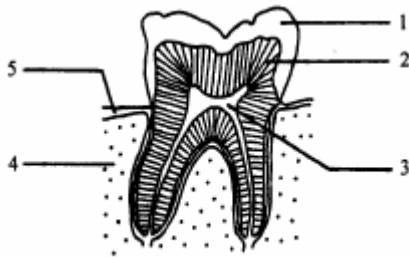
52. 2004/II/22

In a healthy person, structure 3 normally contains a large number of bacteria. What is the ecological relationship between the human and the bacteria

- A. predication B. parasitism C. mutualism D. competition

53. 2004/II/28

Questions 53 to 54 refer to the diagram below, which shows the vertical section of a human tooth:



Which structures are hard and rigid?

- A. 1, 2 and 3 B. 1, 2 and 4 C. 1, 3 and 5 D. 2, 4 and 5

54. 2004/II/29

Which structures receive a continuous supply of nutrients?

- A. 1, 2 and 3 B. 3, 4 and 5 C. 1, 2, 4 and 5 D. 2, 3, 4 and 5

55. 2005/II/11

Excess amino acids absorbed into the human body will be

- A. used to form bile B. used to form a new cells
C. stored in the liver as protein D. converted to urea and carbohydrates

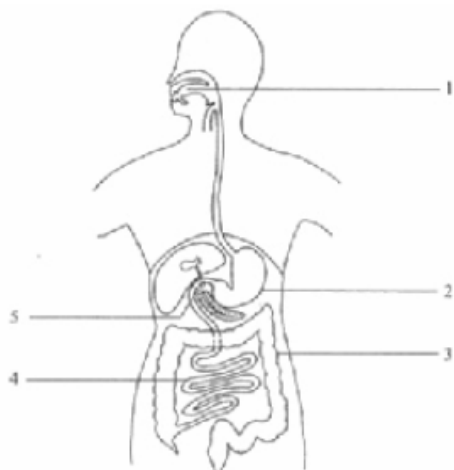
56. 2005/II/13

Bile is a digestive juice in our body. Which of the following statements about bile is correct?

- A. It is produced by the gall bladder B. It contains an enzyme that digests fat
C. It helps break down fat into droplets D. It stimulates peristaltic movement of the small intestine

57. 2005/II/19

Questions 57 to 58 refer to the diagram below, which shows the alimentary canal and its associated structure:



Chemical digestion of carbohydrates occurs in

- A. 1 and 2 B. 1 and 4 C. 2 and 3 D. 3 and 4

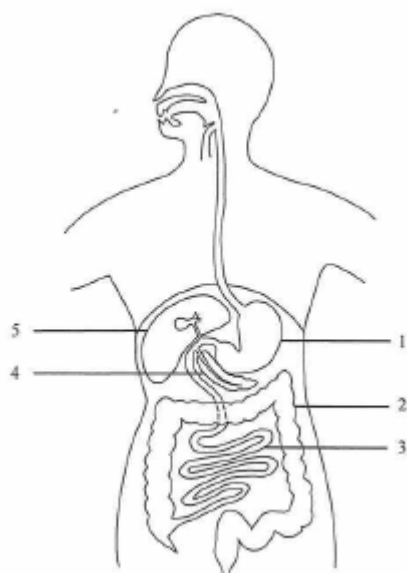
58. 2005/II/20

If structure 5 of a person were blocked, which of the following would occur?

- A. His faeces would contain a lot of fat. B. His faeces would become hard and dry.
C. His blood insulin level would decrease. D. He would produce a large volume of dilute urine.

59. 2006/II/1

Questions 59 and 60 refer to the diagram below, which shows the alimentary canal and its associated structures:



Which structures are responsible for producing secretions that help the digestion of fat?

- A. 1 and 3 only B. 1 and 5 only C. 2 and 3 only D. 4 and 5 only

60. 2006/II/2

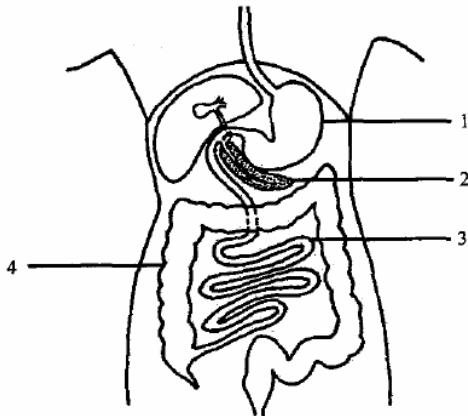
Which of the following operations may help an obese person to control body weight?

- (1) decrease the volume of 1
- (2) decrease the length of 2
- (3) decrease the length of 3

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

61. 2007/II/19

Questions 61 and 62 refer to the diagram below, which shows the human alimentary canal and its associated structures:



Which of the following structures are responsible for producing secretions that help the digestion of proteins?

A. 1 and 2 B. 1 and 3 C. 2 and 3 D. 1, 2 and 3

62. 2007/II/20

Which of the following would be the possible effect of removing part of structure 4 in an operation?

- A. Less faeces will be produced
- B. Oily faeces will be produced
- C. Hard faeces will be produced
- D. Watery faeces will be produced

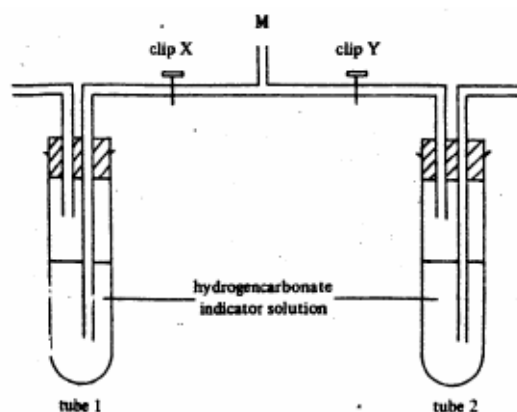
63. 2008/II/1

Which of the following nutrients is mainly transported via lacteal in the small intestine after absorption?

A. iron B. calcium C. vitamin A D. vitamin C

1. 1990/II/14

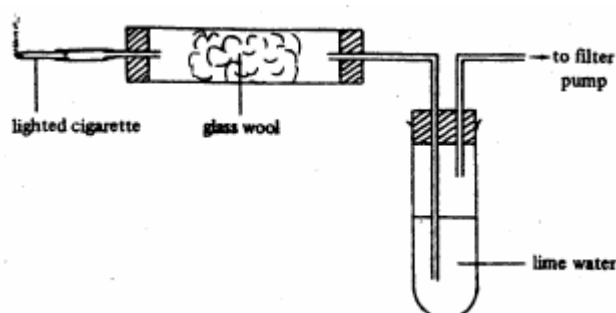
The following experiment is used to compare the amounts of a certain component in exhaled air and inhaled air:



When a student exhales air through M, which of the following combinations is correct?

	Clip X	Clip Y	Colour of indicator in tube 1	Colour of indicator in tube 2
A.	closed	open	yellow	red
B.	closed	open	red	yellow
C.	open	closed	red	yellow
D.	open	closed	yellow	red

2. 1990/II/18

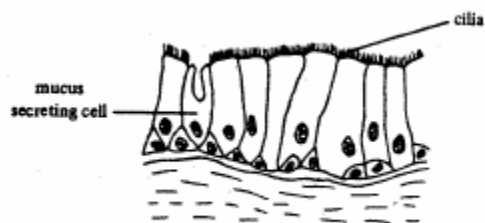


Using the above experiment set-up, which of the following substances present in cigarette smoke can be determined?

- (1) tar
 (2) nicotine
 (3) carbon dioxide
- A. (1) only B. (3) only C. (1) and (3) only D. (2) and (3) only

3. 1990/II/20

Questions 3 and 4 refer to the diagram below which shows the inner lining of a certain part of the human body:



This inner lining can be found in

- A. the trachea B. the alveolus C. the renal tubules D. the small intestine

4. 1990/II/21

The function of this lining is to facilitate

- A. the exchange of gas B. the removal of dust particles
C. the absorption of food substance D. the reabsorption of useful materials

5. 1991/II/18

Which of the following are common characteristics of the respiratory surfaces of both frogs and man?

- (1) a moist surface
(2) a thin surface
(3) a surface with a rich supply of blood capillaries

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

6. 1991/II/20

Cigarette smoking is hazardous to health because

- (1) cigarette smokers eventually die of lung cancer.
(2) there is a high correlation between cigarette smoking and heart diseases.
(3) tar from cigarette smoking is deposited on the surface of the alveoli thereby reducing the efficiency of gaseous exchange.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

7. 1992/II/25

The table below shows the tar and nicotine content present in the cigarette smoke of 5 brands of cigarettes:

Brand of cigarette	With filter (+) or without filter (-)	Tar (mg/cigarette)	Nicotine (mg/cigarette)
P	+	15	1.0
Q	-	33	2.1
R	+	20	1.3
S	+	22	1.4
T	-	38	3.2

Which of the following statements is correct?

- A. Cigarette filters can reduce the tar content but increase the nicotine content
- B. Cigarette filters can increase the tar content but reduce the nicotine content
- C. Cigarette filters can increase both the tar content and the nicotine content
- D. No conclusion can be drawn from the above results

8. 1992/II/26

Vital capacity is the maximum volume of air breathed out

- A. during exercises
- B. in a resting condition
- C. after the deepest inspiration
- D. after the deepest expiration

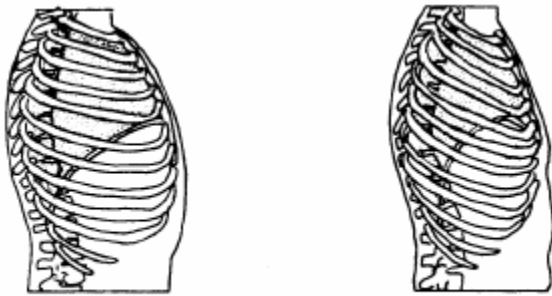
9. 1992/II/27

Which of the following shows the correct sequence of air passage into the lungs?

- A. trachea → larynx → air sacs → bronchi
- B. larynx → trachea → bronchi → air sacs
- C. air sacs → larynx → trachea → bronchi
- D. larynx → bronchi → trachea → air sacs

10. 1993/II/18

Question 10 and 11 refer to the two diagrams below which shows the side view of human thorax in two different conditions :



Condition I

Condition II

Which of the following occurs when the thorax changes from condition I to condition II?

- A. Intercostal muscle contracts and the air flows into the lungs
- B. Intercostal muscle contracts and the air flows out of the lungs
- C. Intercostal muscle relaxes and the air flows into the lungs
- D. Intercostal muscle relaxes and the air flows out of the lungs

11. 1993/II/19

Which of the following is correct when the thorax changes from condition II to condition I?

Diaphragm muscle	Pressure in lungs
A. contracts	increases
B. relaxes	increases
C. contracts	decreases
D. relaxes	decreases

12. 1993/II/20

What will happen when the pleural membrane is punctured?

- A. The air sacs are damaged
- B. The lungs cannot expand
- C. The diaphragm cannot contract
- D. The ribs cannot be raised upwards

13. 1993/II/21

Which of the following statements about cigarette smoking is correct?

- A. Nicotine causes lung cancer
- B. Nicotine stains the lungs brown
- C. Tar is the main factor that causes addiction to smoking
- D. Carbon monoxide reduces blood oxygen content

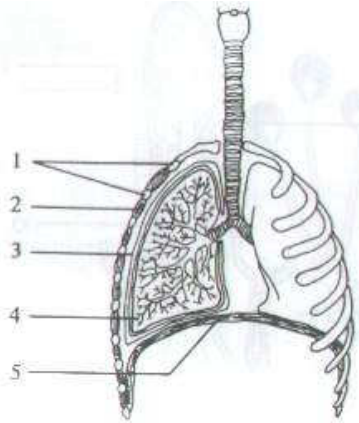
14. 1994/II/38

Which of the following sequences of events will occur when a person inhales while he is asleep?

- A. The diaphragm muscles contract → atmospheric air rushes into the lungs → the lungs dilate
- B. The intercostal muscles contract → atmospheric air rushes into the lungs → the lungs dilate
- C. The diaphragm muscles contract → the lungs dilate → atmospheric air rushes into the lungs
- D. The intercostal muscles contract → the lungs dilate → atmospheric air rushes into the lungs

15. 1995/II/17

Question 15 and 16 refer to the diagram below which shows the human respiratory system :



Which of the following are the functions of structure 1?

- (1) forming red blood cells
- (2) protecting the lungs
- (3) helping ventilation

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

16. 1995/II/18

Which structures contract rhythmically during breathing?

- A. 2 and 4
- B. 2 and 5
- C. 3 and 4
- D. 3 and 5

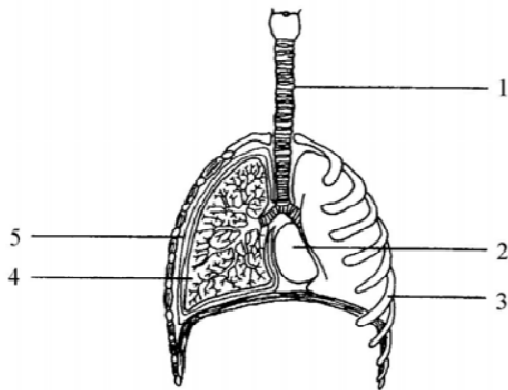
17. 1995/II/19

Which of the following may cause heart disease and damage of cilia in the trachea ?

- A. alcohol drinking
- B. cigarette smoking
- C. too much fatty food in the diet
- D. too much salted fish in the diet

18. 1996/II/19

Questions 18 to 20 refer to the diagram below which shows some of the structures in the human thoracic cavity:



Heavy cigarette smoking will affect the functioning of

- A. structures 1, 2 and 3. B. structures 1, 2 and 4.
C. structures 1, 3 and 4. D. structures 2, 3 and 4.

19. 1996/II/20

Which of the following correctly describes the long-term effect of cigarette smoking on the body?

- A. The breathing rate decreases. B. Voluntary actions become faster.
C. The blood pressure becomes lower. D. The oxygen level in the blood becomes lower.

20. 1996/II/21

Which of the following will occur if structure 5 is broken?

- A. The lungs will collapse. B. The ribs will stop moving.
C. The air sacs will be filled with water. D. The diaphragm will not be able to contract.

21. 1996/II/58

The exhaled air from our body consists mostly of

- A. carbon dioxide. B. nitrogen. C. oxygen. D. water vapour.

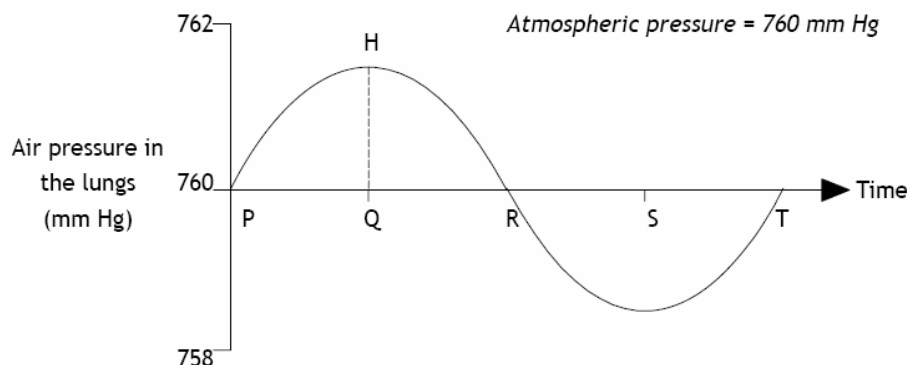
22. 1997/II/19

Which of the following changes will occur when a person is doing vigorous exercise?

	Depth of breathing	Rate of breathing	% O₂ in inhaled air
A.	increases	increases	increases
B.	decreases	constant	increases
C.	increases	increases	constant
D.	decreases	constant	constant

23. 1998/II/14

Questions 23 to 25 refer to the graph below which shows the change in air pressure in the lungs of a person :



Inhalation occurs from

- A. P to Q. B. P to R. C. R to S. D. R to T.

24. 1998/II/15

Which of the following correctly describes the state of the intercostals muscle and the shape of the diaphragm at Q ?

- | | Intercostal muscle | Diaphragm |
|----|---------------------------|------------------|
| A. | contracted | flattened |
| B. | contracted | dome-shaped |
| C. | relaxed | flattened |
| D. | relaxed | dome-shaped |

25. 1998/II/16

The shape of the curve above will change when the person is doing vigorous exercise. Which of the following correctly describes the changes ?

- | | Distance between P and T | Distance between H and Q |
|----|---------------------------------|---------------------------------|
| A. | increases | increases |
| B. | increases | decreases |
| C. | decreases | increases |
| D. | decreases | decreases |

26. 1999/II/36

Regular exercise may increase the vital capacity of a person. What is the advantage of having a larger vital capacity ?

- A. The lungs can take in more air during exercise.
 B. The breathing rate can increase more during exercise.
 C. The lungs can take in air with a higher oxygen concentration during exercise.
 D. Normal activity can be maintained at a lower breathing rate.

27. 2001/II/15

Which of the following features of the respiratory tract helps to warm the inhaled air ?

- A. The nasal cavity has a lot of hair.
- B. The lining of the trachea is covered with cilia.
- C. The lining of the respiratory tract is coated with mucus.
- D. The wall of the nasal cavity is richly supplied with capillaries.

28. 2001/II/49

Questions 28 and 29 refer to the passage below, which is an extract from a newspaper article dated 28 August 1997 :

An accident occurred in the Intensive Care Unit of a local hospital yesterday. A patient was supposed to be fed with milk through a tube in his nose. However, a student nurse mistakenly connected a nutrition pack containing milk to a tube in the patient's neck, dripping the milk into his veins instead of his stomach. This mistake was discovered 45 minutes later.

'The fat in the milk could block blood circulation in serious circumstances, particularly in the small blood vessels. Fortunately, the patient's condition has become stable after 48 hours' observation, 'a doctor of the hospital said.

The tube in the patient's nose was connected to

- A. the nasal cavity.
- B. the trachea.
- C. the oesophagus.
- D. the small intestine.

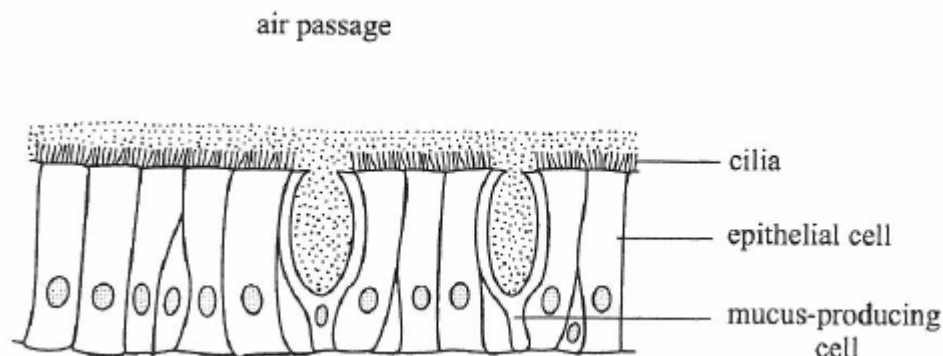
29. 2001/II/50

Dripping milk into the veins might have led to the blockage of small blood vessels in some organs. Based on your knowledge of the circulatory pathway, which of the following organs would most likely be affected first ?

- A. the liver
- B. the lung
- C. the brain
- D. the kidney

30. 2002/II/26

Questions 30 and 31 refer to the diagram below, which shows a section of the inner lining of the human respiratory tract :



This section is most probably taken from

- A. the nostril. B. the pharynx. C. the bronchus. D. the air sac.

31. 2002/II/27

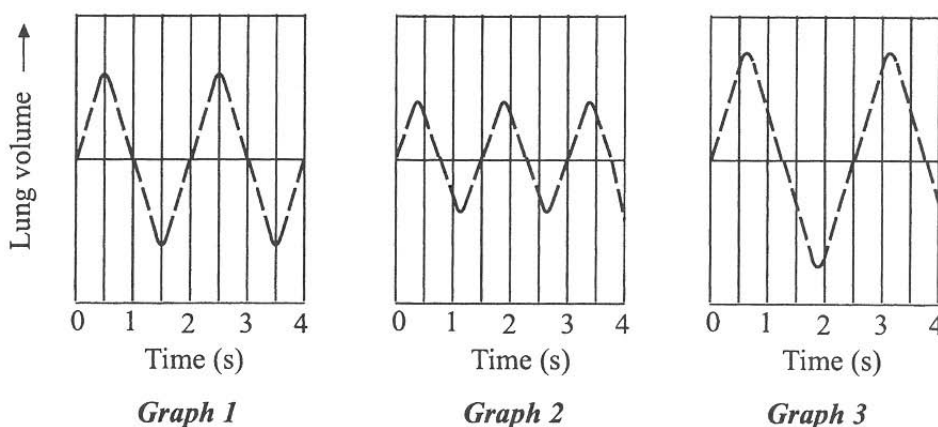
What features of the inner lining help in protecting the body against bacterial infection?

- (1) beating of cilia
 (2) presence of mucus
 (3) close packing of the epithelial cells

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

32. 2002/II/30

Questions 32 and 33 refer to the graphs below, which show the rate and depth of breathing of three persons during a fitness test :



Referring to graph 1, what is the breathing rate of the person ?

- A. 15 breaths per minute B. 30 breaths per minute
 C. 45 breaths per minute D. 60 breaths per minute

33. 2002/II/31

The three persons are a cigarette smoker, a non-smoker and a professional runner. Which of the following correctly identifies the person represented by each of the graphs?

Graph 1	Graph 2	Graph 3
A. smoker	non-smoker	runner
B. non-smoker	runner	smoker
C. non-smoker	smoker	runner
D. runner	smoker	non-smoker

34. 2003/II/17

Which of the following correctly lists the sequence of events that follows the contraction of the intercostal muscles and diaphragm muscle?

- (1) Air enters the lungs
 (2) The lungs volume increases
 (3) The pressure in the lung decrease
- A. (2), (1), (3) B. (2), (3), (1) C. (3), (1), (2) D. (3), (2), (1)

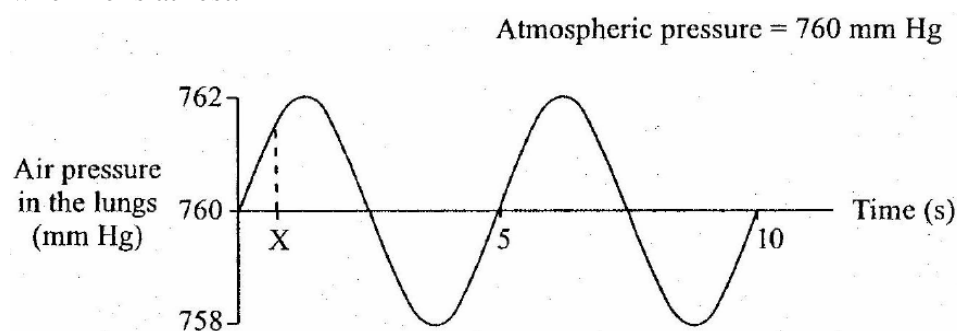
35. 2005/II/5

The lining of the nasal cavity is covered with a thin film of mucus. What is the importance of the mucus?

- A. It warms up the inhaled air
 B. It helps remove dust from incoming air
 C. It lubricates the passage of air into the respiratory tract
 D. It helps dissolve oxygen in the inhaled air for gas exchange

36. 2005/II/17

Questions 36 and 37 refer to the graph below, which shows the changes in air pressure in the lungs of a person when he is at rest:



What is the rate of breathing of this person at rest?

- A. 10 breaths per minute B. 12 breaths per minute
 C. 18 breaths per minute D. 24 breaths per minute

37. 2005/II/18

Which of the following correctly describes the state of the intercostal muscles and the diaphragm at time X?

Intercostal muscles	Diaphragm
A. contracting	dome-shaped
B. contracting	flattened
C. relaxing	dome-shaped
D. relaxing	flattened

38. 2007/II/9

Which of the following structures is supported by cartilage?

- A. aorta B. urethra C. trachea D. oesophagus

39. 2007/II/12

Which of the following correctly describes the function of the human breathing system?

- A. The bronchus cannot change its size
B. The nasal cavity has hairs to trap dust
C. The diaphragm contracts during inhalation
D. The lung expels air through its muscular contraction

40. 2007/II/13

Cigarette smoking results in the deposition of tar on the inner surface of the air sacs. This would decrease

- A. the depth of breathing
B. the efficiency of gas exchange
C. the resistance for gas diffusion
D. the amount of oxygen that flows into the lungs

41. 2007/II/41

The film of water on the surface of human air sacs serves to

- A. warm the incoming air B. moisten the incoming air
C. trap dust in the inhaled air D. dissolve the gases in the inhaled air

42. 2008/II/7

The atmospheric pressure is lower at high altitude than at sea level. If someone gets to a place of higher altitude, his breathing rate increases. This is probably due to the fact that

- A. the heartbeat rate of a person is faster at higher altitude.
B. the percentage of oxygen in air drops at higher altitude.
C. The metabolic rate of a person is faster at higher altitude.
D. The amount of oxygen inhaled in each breath of a person is lesser at higher altitude.

1. 1990/II/3

Human red blood cells and onion epidermal cells are similar in that they both

- A. possess cell walls B. possess central vacuoles C. have no nuclei D. have no chloroplasts

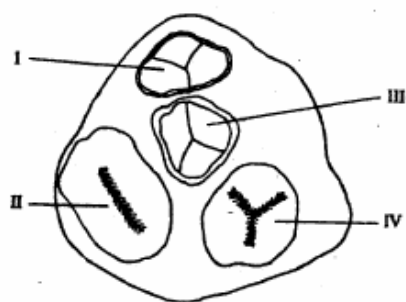
2. 1990/II/25

Which of the following types of blood vessels has the largest total surface areas in a mammalian body?

- A. the aortas B. the arteries C. the capillaries D. the veins

3. 1990/II/31

Questions 3 and 4 refer to the diagram below which shows a pig's heart with certain chambers/parts removed to show the structure of various valves:



Valve II lies

- A. between the aorta and the left ventricles B. between the pulmonary artery and the right ventricle
C. between the left auricles and left ventricles D. between the right auricles and right ventricles

4. 1990/II/32

Which of the following valves open when the ventricles are contracting?

- A. valves I and II B. valves I and III C. valves II and IV D. valves III and IV

5. 1990/II/48

In a fasting conditions, which of the following blood vessels carries blood with the highest glucose level?

- A. aorta B. pulmonary artery C. hepatic vein D. hepatic portal vein

6. 1990/II/60

How many times must a red blood cell pass through the right ventricle if it is to move from the lungs to the kidney and then back to the lungs again?

- A. 0 B. 1 C. 2 D. 3

7. 1991/II/25

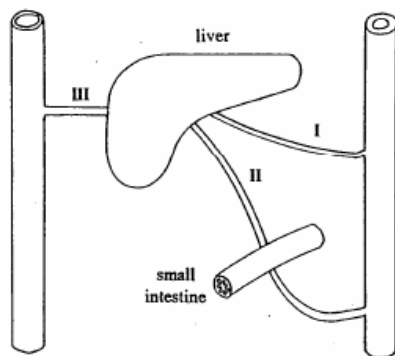
The wall of an artery is thicker than that of a vein because the artery

- (1) contracts rhythmically to transport blood forward
- (2) possess valves to prevent the backflow of blood
- (3) has to withstand high blood pressure

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

8. 1991/II/26

Questions 8 and 9 refer to the diagram below, which shows the blood vessels associated with the liver and the small intestine of a mammal:



Which of the following is correct?

Blood vessel I

Blood vessel III

- | | |
|-------------------|--------------|
| A. less oxygen | more oxygen |
| B. less urea | more urea |
| C. valves present | no valves |
| D. thinner wall | thicker wall |

9. 1991/II/27

Which of the following statements about vessel II is correct?

- A. It carries bile into the intestine
- B. It has a capillary network at both ends
- C. It carries blood with the highest concentration of oxygen
- D. It carries blood with the highest concentration of fatty acids

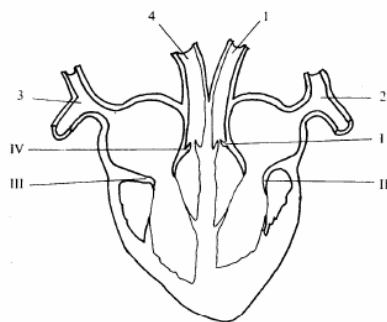
10. 1992/II/34

In blood donation, blood is collected from the vein instead of the artery because

- A. blood in the vein contains less oxygen
- B. the vein has a larger lumen than the artery
- C. the wall of the vein is thinner than that of the artery
- D. the blood pressure in the vein is lower than that in the artery

11. 1993/II/26

Questions 11 and 12 refer to the diagram below, which shows a section of the mammalian heart:



Which of the blood vessel carries/carry oxygenated blood?

- A. 1 B. 4 C. 1 and 2 D. 3 and 4

12. 1993/II/27

The closing of which valves produces the characteristic 'heart sounds'?

- A. I and II B. II and III C. III and IV D. I, II, III and IV

13. 1994/II/12

Which of the following correctly describes the difference between the composition of blood in the hepatic portal vein and the hepatic vein of a man after fasting for 12 hours?

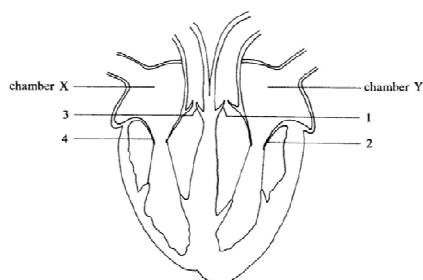
Blood in the hepatic portal vein**Blood in the hepatic vein**

- | | | |
|-----|--------------|--------------|
| (1) | less urea | more urea |
| (2) | more glucose | less glucose |
| (3) | without bile | with bile |

- A. (1) only B. (2) only C. (1) and (2) only D. (2) and (3) only

14. 1994/II/14

Questions 14 and 15 refer to the diagram below which shows a section of a human heart:



What happens to the heart valves when the atria (auricles) and ventricles are all relaxed?

- A. Valves 1 and 2 are closed while valves 3 and 4 are open.
 B. Valves 1 and 3 are closed while valves 2 and 4 are open.
 C. Valves 1 and 3 are open while valves 2 and 4 are closed.
 D. The condition of the heart valves depends on the activity of the person.

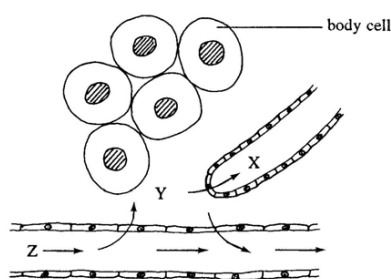
15. 1994/II/15

What will be the effect on a person if there is a hole in the septum that separates chambers X and Y?

- A. The person may develop anaemia.
- B. The person may have a heart attack easily.
- C. The person's blood may not be able to clot normally.
- D. The person's arterial blood may contain a lower level of oxygen than normal.

16. 1994/II/16

Questions 16 and 17 refer to the diagram below which shows part of the circulatory system in a mammal:



Key : → indicates the flow direction

The fluids X, Y and Z are

- | X | Y | Z |
|-----------------|--------------|--------------|
| A. lymph | blood | tissue fluid |
| B. blood | tissue fluid | lymph |
| C. lymph | tissue fluid | blood |
| D. tissue fluid | lymph | blood |

17. 1994/II/17

Which of the following comparisons between fluid X and fluid Z is correct?

- | X | Z |
|-----------------------------|---------------------------|
| A. white blood cells absent | white blood cells present |
| B. dull red | bright red |
| C. less protein | more protein |
| D. high oxygen content | low oxygen content |

18. 1995/II/22

Normally, blood does **not** contain

- A. fat B. proteins C. bile pigments D. carbon dioxide

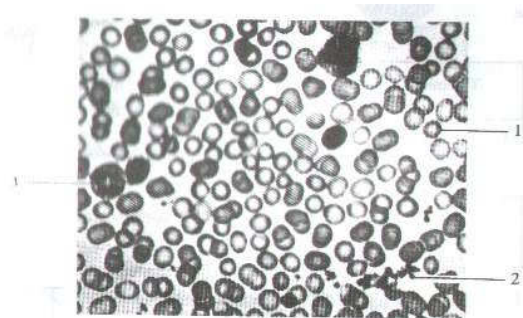
19. 1995/II/23

All veins carry

- A. deoxygenated blood B. blood rich in carbon dioxide
C. blood with a low glucose level D. blood at a relatively low pressure

20. 1995/II/24

The photomicrograph below shows a human blood smear:



Which of the following are the functions of structures 1, 2 and 3?

Structure 1

- A. Transports oxygen
B. Transports oxygen
C. Transports carbon dioxide
D. Transports carbon dioxide

Structure 2

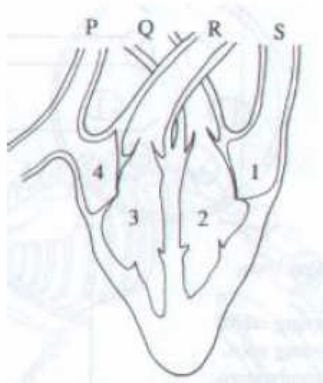
- transports glucose
for blood clotting
transports glucose
for blood clotting

Structure 3

- transport carbon dioxide
engulfs bacteria
engulfs bacteria
transports oxygen

21. 1995/II/25

Question 21 and 22 refer to the diagram below which shows a section of the mammalian heart :



With reference to the diagram, which heart chambers are contracting?

- A. 1 and 2 B. 1 and 4 C. 2 and 3 D. 3 and 4

22. 1995/II/26

Which blood vessels are connected to the lungs?

- A. P and Q B. Q and R C. R and S D. S and P

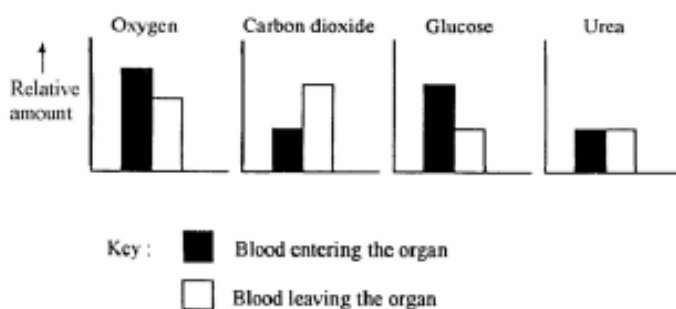
23. 1995/II/27

Heart attacks are caused by

- A. a lack of iron in the diet B. reduced blood supply to the heart muscle
C. an accumulation of lactic acid in the blood D. breathing in air containing carbon

24. 1996/II/27

The bar charts below show the relative amounts of four substances in the blood entering and leaving a certain organ in the body:

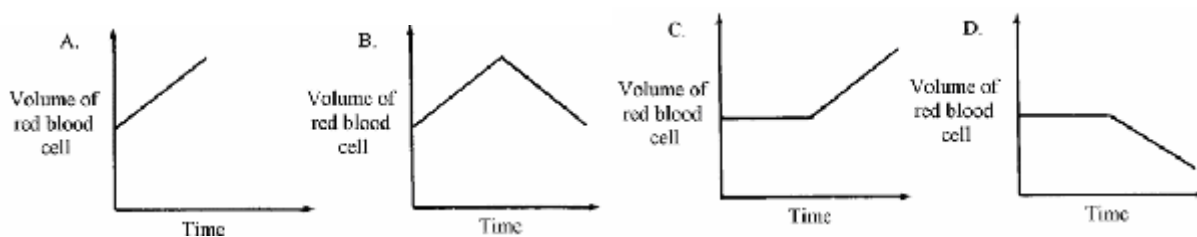


This organ is

- A. the brain B. the kidney C. the liver D. the lung

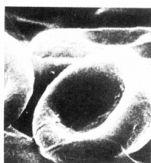
25. 1997/II/14

Which of the following graphs correctly shows the change in volume of a red blood cell when it is put in 0.05% salt solution?



26. 1997/II/20

The photomicrograph below shows the appearance of some human red blood cells:



The shape of the red blood cells allows them

- A. to carry more haemoglobin B. to have closer contact with the tissue cells
C. to absorb and release oxygen more rapidly D. to pass through the wall of the blood capillaries more easily

27. 1997/II/21

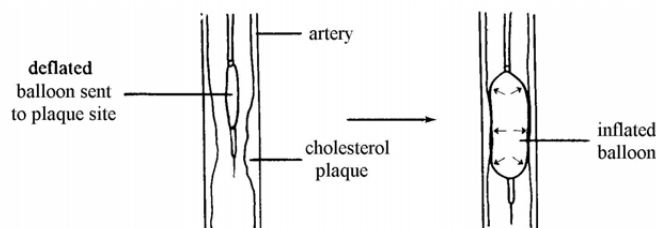
Which of the following correctly shows the route of a red blood cell from the lung to the liver?

- A. lung → pulmonary vein → left atrium → left ventricle → aorta → liver
- B. lung → pulmonary vein → right atrium → right ventricle → aorta → liver
- C. lung → pulmonary artery → left atrium → left ventricle → hepatic artery → liver
- D. lung → pulmonary artery → right atrium → right ventricle → hepatic artery → liver

28. 1997/II/25

Questions 28 and 29 refer to the following information:

Cholesterol plaque is formed by the accumulation of cholesterol on the wall of arteries. The diagrams below show the type of operation which is used to treat the blockage of arteries by cholesterol plaque:



Which of the following statements is incorrect?

- A. The inflated balloon helps to widen the lumen of the artery.
- B. The larger the plaque in the artery, the lower of the blood pressure.
- C. This operation may restore normal blood flow through the artery.
- D. Formation of the plaque in the artery is partly due to a low fibre, high fat diet.

29. 1997/II/26

If the arteries of the heart wall are blocked by cholesterol plaque, a heart attack may occur because



- A. the rate of heart beat increases
- B. less blood is pumped out from the heart
- C. the heart muscle becomes fatigued easily
- D. less blood is supplied to the heart muscle

30. 1999/II/18

Questions 30 and 31 refer to the diagram below, which represents the conditions of the atria and the ventricles in one complete heart beat of a person :

Atrium	1	2	3	4	5	6	7	8
ventricle	1	2	3	4	5	6	7	8

Key : 1 to 8 represent the different time intervals in one complete heart beat

	period of contraction
	period of relaxation

Which of the following correctly describes the conditions of the heart valves during interval 1 ?

Bicuspid valve**Tricuspid valve**

- | | |
|-----------|--------|
| A. closed | closed |
| B. closed | opened |
| C. opened | opened |
| D. opened | closed |

31. 1999/II/19

During intervals 2 to 4, blood flows

- | | |
|---------------------------------------|--|
| A. from the atria into the ventricles | B. from the veins into the ventricles |
| C. from the ventricles into the atria | D. from the ventricles into the arteries |

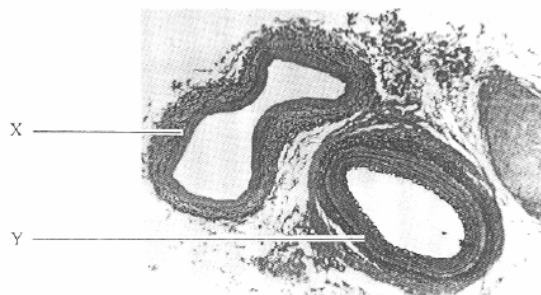
32. 1999/II/22

Which of the following blood vessels has the lowest blood pressure?

- | | | | |
|--------------|-----------------|------------------------|-----------------------------|
| A. vena cava | B. hepatic vein | C. hepatic portal vein | D. capillaries in the liver |
|--------------|-----------------|------------------------|-----------------------------|

33. 1999/II/24

Questions 33 and 34 refer to the photomicrograph below, which shows the transverse section of two blood vessels connecting the heart and the lung :



Which heart chamber is connected to vessel X?

- | | | | |
|----------------|-------------------|-----------------|--------------------|
| A. left atrium | B. left ventricle | C. right atrium | D. right ventricle |
|----------------|-------------------|-----------------|--------------------|

34. 1999/II/25

Which of the following comparisons between the blood in vessels X and Y is correct?

	<i>Oxygen concentration</i>		<i>Glucose concentration</i>	
	X	Y	X	Y
A.	higher	lower	higher	lower
B.	lower	higher	lower	higher
C.	higher	lower	lower	higher
D.	lower	higher	higher	lower

35. 1999/II/28

A person has not taken any food for 24 hours. Which of the following components of the blood increases in concentration after passing through the intestinal villus of the person ?

- A. urea B. insulin C. glucose D. carbon dioxide

36. 1999/II/35

The metabolic wastes excreted by a mammal include

- (1) carbon dioxide
 (2) lactic acid
 (3) undigested food

- A. (1) only B. (1) and (2) only C. (2) and (3) only D. (1), (2) and (3)

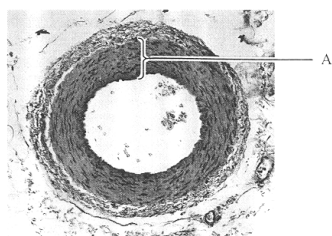
37. 2000/II/13

Which of the following shows the correct arrangement of the blood vessels in descending order of urea concentration in the blood?

- A. vena cava, hepatic vein, renal vein B. vena cava, renal vein, hepatic vein
 C. hepatic vein, renal vein, vena cava D. hepatic vein, vena cava, renal vein

38. 2000/II/20

The photomicrograph below shows the transverse section of an arteriole :



Which of the following are the functions of tissue A?

- (1) It helps to regulate the diameter of the arteriole
 (2) It helps the arteriole to withstand high blood pressure
 (3) Its contraction helps to propel blood along the arteriole

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

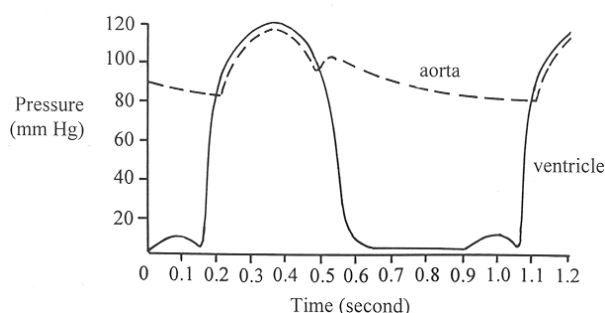
39. 2000/II/21

Which of the following comparisons between a vein and a lymph vessel is correct?

Vein	Lymph vessel
A. valves present	valves absent
B. oxygen present	oxygen absent
C. red blood cells present	red blood cells absent
D. white blood cells present	white blood cells absent

40. 2000/II/22

Questions 40 and 41 refer to the graph below, which shows the changes in pressure in the aorta and that in the left ventricle of the heart in a certain time interval :



During which period are the semi-lunar valves open?

- A. 0 to 0.2 second B. 0.2 to 0.5 second C. 0.5 to 0.6 second D. 0.6 to 0.9 second

41. 2000/II/23

What is the rate of heart beat of this person?

- A. 60 beats per minute B. 67 beats per minute C. 75 beats per minute D. 86 beats per minute

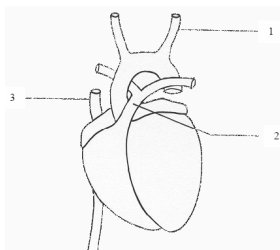
42. 2001/II/5

Which of the following activities cannot be performed by the human red blood cells?

- A. production of energy B. replication of DNA C. uptake of glucose D. release of oxygen

43. 2001/II/25

Questions 43 and 44 refer to the diagram below, which shows the ventral view of a mammalian heart:



Which blood vessel(s) carries blood with a low oxygen concentration?

- A. 1 only B. 3 only C. 1 and 2 only D. 2 and 3 only

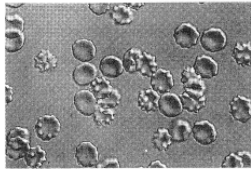
44. 2001/II/26

Which of the following is correct when blood is flowing out of the heart through blood vessel 2?

- A. The atria are contracting.
- B. The ventricles are contracting.
- C. The semi-lunar valves are closed.
- D. The tricuspid and bicuspid valves are open.

45. 2002/II/35

Which of the following can account for the appearance of the red blood cells shown in the photomicrograph below?



Source:
Gareth Williams, *Advanced Biology for you*,
Cheltenham: Stanley Thomas Publishers Ltd.,
2000.

- A. The red blood cells are undergoing mitosis.
- B. The red blood cells are in the deoxygenated state.
- C. The red blood cells are bathed in a concentrated sugar solution.
- D. The cell membrane of the red blood cells becomes greatly folded to increase the surface area for oxygen uptake.

46. 2002/II/38

Questions 46 and 47 refer to the passage below :

Atherosclerosis is a condition in which the smooth internal lining of blood vessels becomes covered with fatty deposits. This causes a reduction in the diameter of the blood vessels. The fatty deposits often cause the formation of blood clots which further narrow the blood vessels and eventually block them completely. Atherosclerosis is becoming more common in many countries and this has led to an increase in the incidence of heart attack.

Narrowing of blood vessels of the heart may lead to heart attack because

- A. less blood returns to the atria from the veins.
- B. less blood flows out of the ventricles to the arteries.
- C. less oxygen reaches the heart muscles.
- D. less nutrients are transported in the blood.

47. 2002/II/39

Which of the following are possible causes for the increase in number of atherosclerosis cases?

- (1) excessive intake of fatty food
 - (2) insufficient physical exercise
 - (3) insufficient bile secretion
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

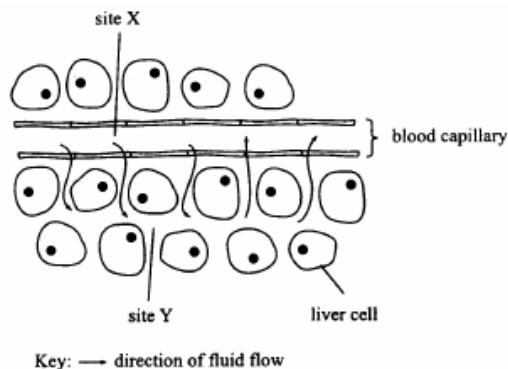
48. 2003/II/23

A person's feet may become swollen after he has been sitting for many hours, such as on a long-distance flight. This is because

- A. the blood pressure in the veins of the legs become lower
- B. the blood flow in the arteries of the legs becomes slower
- C. tissue fluid is drained from the legs more slowly
- D. tissue fluid is formed in the legs more rapidly

49. 2004/II/1

Questions 49 and 50 refer to the diagram below which shows the movement of fluid in and out of a capillary in the liver tissue:



Which of the following is a correct comparison of the fluid in X and that in Y when a person has not eaten for 12 hours?

- | Fluid X | Fluid Y |
|---------------------------------|-------------------------------|
| A. urea absent | urea present |
| B. white blood cells present | white blood cells absent |
| C. higher glucose content | lower glucose content |
| D. lower carbon dioxide content | higher carbon dioxide content |

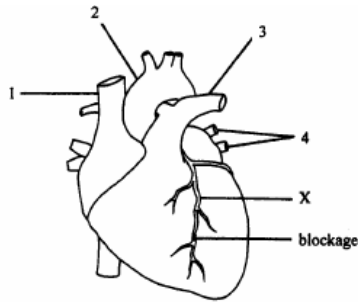
50. 2004/II/2

The movement of fluid back into the capillary is mainly caused by

- A. active transport
- B. osmosis
- C. secretion
- D. ultra-filtration

51. 2004/II/10

Questions 51 and 52 refer to the diagram below which shows the ventral view of the human heart:



Vessel X is responsible for supplying blood to the heart muscle. It receives blood directly from

- A. vessel 1 B. vessel 2 C. vessel 3 D. vessel 4

52. 2004/II/11

Which of the following will occur if vessel X is blocked as shown in the diagram?

- A. Some heart muscle will die
 B. The heart will pump out more blood in each beat
 C. The blood pressure in the artier will become higher
 D. The carbon dioxide content of the blood in the veins will become lower

53. 2005/II/44

Which of the following comparisons between blood and lymph is correct?

- | Blood | Lymph |
|----------------------------|------------------------|
| A. fat absent | fat present |
| B. glucose present | glucose absent |
| C. phagocyte absent | phagocyte present |
| D. red blood cells present | red blood cells absent |

54. 2006/II/33

The table below shows the ratio of the mean diameter of lumen to the mean thickness of vessel wall of three types of blood vessels:

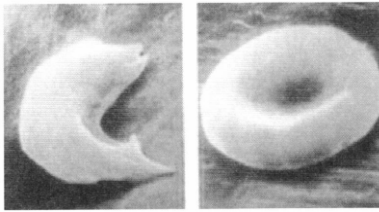
	Blood vessels		
	P	Q	R
Ratio	10	4	16

Which of the following correctly identifies blood vessels P, Q and R?

- | P | Q | R |
|--------------|-----------|-----------|
| A. artery | capillary | vein |
| B. vein | capillary | artery |
| C. vein | artery | capillary |
| D. capillary | vein | capillary |

55. 2006/II/34

The photomicrograph below show the appearance of two red blood cells viewed under the same magnification. The one on the left shows a defective red blood cell. The one on the right shows a normal red blood cell.

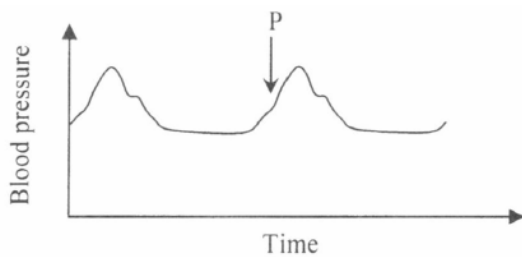


Which of the following descriptions about the defective red blood cell is correct?

- A. It has a smaller surface area to volume ratio than the normal red blood cell.
- B. It has a lower water potential than the normal red blood cell.
- C. It has a higher oxygen carrying capacity than the normal red blood cell.
- D. It contains nucleus while the normal red blood cell has lost the nucleus.

56. 2006/II/49

Questions 56 and 57 refer to the graph below, which shows the periodic change in the blood pressure in the aorta.



At point P, what are the conditions of the bicuspid and semilunar valves?

- | | Bicuspid valve | Semilunar valves |
|----|-----------------------|-------------------------|
| A. | open | close |
| B. | open | open |
| C. | close | open |
| D. | close | close |

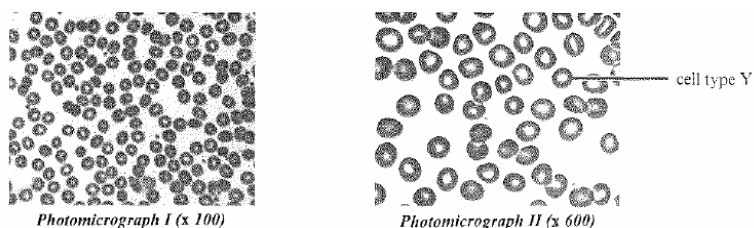
57. 2006/II/50

Which of the following are responsible for the periodic change in the blood pressure in the aorta?

- (1) pumping of heart
 - (2) thickness of the wall of aorta
 - (3) elasticity of the wall of aorta
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

58. 2007/II/10

Questions 58 and 59 refer to the photomicrograph below, which shows a stained human blood smear under different magnifications:



A student first focused on the blood smear under the microscope and obtained an image as shown in photomicrograph I.

In order to obtain an image as shown in photomicrograph II, which of the following steps are necessary?

- (1) Turn the nosepiece
- (2) Turn the fine adjustment knob
- (3) Adjust the position of the condenser

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

59. 2007/II/11

The characteristics appearance of cell type Y is due to

- (1) its thicker periphery
- (2) its large central vacuole
- (3) the absence of a nucleus

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

60. 2007/II/14

One day, Adam, Brenda, Calvin and Doris were watching a football match of the World Cup. The following are their dialogues about the heartbeat rate of the football players.

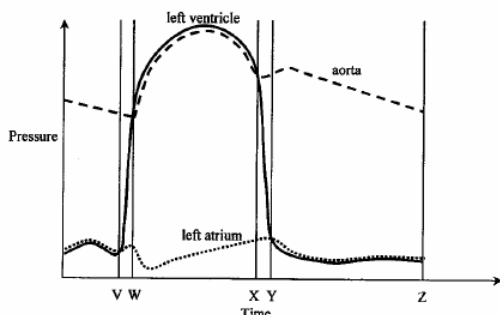
<p>(1)</p> <p>Adam</p> <p>Hey! The football players need more energy than us at rest, so their heartbeat rate is higher.</p>	<p>(2)</p> <p>Brenda</p> <p>No, they are well-trained. They can breathe deeper such that they have a lower heartbeat rate.</p>
<p>(3)</p> <p>Calvin</p> <p>Wrong! They have a stronger heart to pump blood. So, their heartbeat rates should be lower than ours.</p>	<p>(4)</p> <p>Doris</p> <p>I partially agree with Calvin. They have a lower heartbeat rate because their arteriole walls are stronger to pump more blood.</p>

Whose view is correct?

A. Adam's B. Brenda's C. Calvin's D. Doris's

61. 2007/II/21

Questions 61 and 62 refer to the graph below, which shows the changes in pressure of the blood in the aorta, the left atrium and the left ventricle during a heart cycle.



Which of the following combinations shows a correct interpretation of the graph and its supporting reason?

Interpretation of the graph**Supporting reason**

- | | |
|---|---|
| A. the left ventricle is contracting between VW | the left ventricle's pressure is increasing |
| B. the aorta is contracting between XY | the aorta's pressure is increasing |
| C. the left ventricle is relaxing at point V | the left ventricle's pressure is low |
| D. the left atrium starts to relax at point Y | the left atrium's pressure starts to decrease |

62. 2007/II/22

Which of the following correctly describes the condition of the valves during the period YZ?

Bicuspid valve**Semi-lunar valve**

- | | |
|-----------|--------|
| A. closed | closed |
| B. opened | opened |
| C. closed | opened |
| D. opened | closed |

63. 2007/II/23

Which of the following will lead to high blood pressure in the human body?

- (1) Excessive bleeding occurs
 (2) Fat is deposited on the wall of arteries
 (3) The wall of the arteries become less elastic
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

64. 2007/II/45

Passengers traveling on long-distance flights often experience the swelling of the feet. They are advised to stretch their legs more often during the flight because stretching legs helps to

- A. squeeze the arterioles and hence more blood flow away from the legs.
 B. squeeze the lymph vessels and hence more lymph flows away from the legs.
 C. increase the heartbeat rate and hence more blood flows away from the legs.
 D. increase the blood pressure and hence more lymph flows away from the legs.

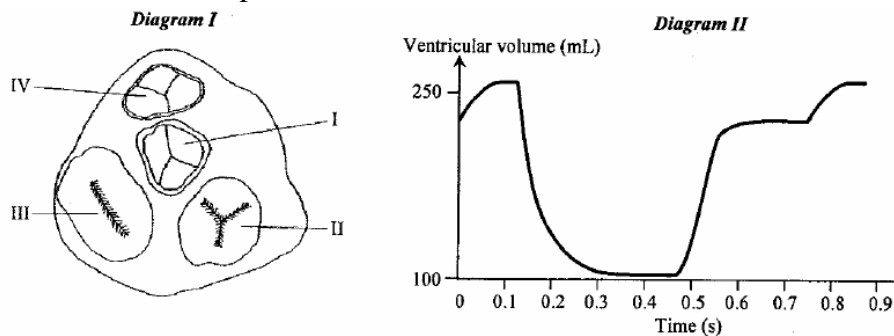
65. 2008/II/15

Which of the following descriptions about the blood capillary is *incorrect*?

- A. It has a thin wall to facilitate exchange of materials between tissue fluid and the blood.
- B. It is highly branched to increase the surface area in contact with the tissue fluid.
- C. It is narrow to help decrease the blood pressure so that the blood flows slowly.
- D. It allows white blood cells to squeeze through to the tissue fluid.

66. 2008/II/16

Questions 66 and 67 refer to the information shown below. Diagram I shows a heart with certain parts removed to reveal various valves. Diagram II shows the change in the ventricular volume of a person's heart within a short period of time.



At 0.2 second, which of the valves in Diagram I are opened?

- A. valves I and II
- B. valves I and IV
- C. valves II and III
- D. valves III and IV

67. 2008/II/17

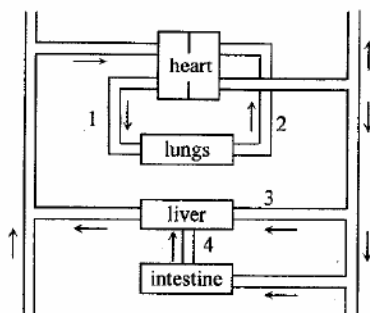
The heartbeat rate of the person is

- A. 86 beats per minute.
- B. 80 beats per minute.
- C. 75 beats per minute.
- D. 67 beats per minute.

68. 2008/II/18

The diagram below shows part of the human circulatory system.

Key: → direction of blood flow

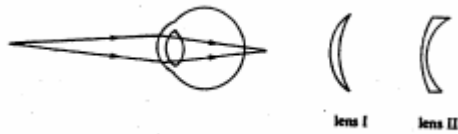


Which of the following correctly compares the oxygen content of the blood in the blood vessels when a person is performing vigorous exercise?

- A. $1 > 3 > 4$
- B. $2 > 1 > 4$
- C. $3 > 4 > 1$
- D. $4 > 2 > 1$

1. 1990/II/50

The drawing below shows a light ray diagram of a human eye with a defect. Lenses I and II can be used to correct certain eye defects.

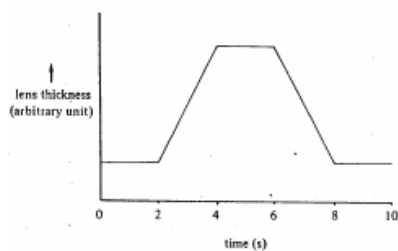


Which of the following describes the above eye defect and the appropriate lens to be used for the correction?

eye defect	lens to be used for correction
A. long sight	lens I
B. long sight	lens II
C. short sight	lens I
D. short sight	lens II

2. 1991/II/44

Questions 2 and 3 refer to the graph below, which shows the changes of the lens thickness of a boy's eye within a period of time:



What is happening to the boy's eye between 2nd and 4th second?

- | | |
|---|--|
| A. The pupil is dilating | B. The ciliary muscles are relaxing |
| C. The suspensory ligaments are contracting | D. The tension on the suspensory ligaments is decreasing |

3. 1991/II/45

Between the 6th and 8th second, the boy is looking at

- | | |
|---------------------------------|-----------------------------------|
| A. a nearby stationary object | B. a far away stationary object |
| C. an object moving towards him | D. an object moving away from him |

4. 1993/II/31

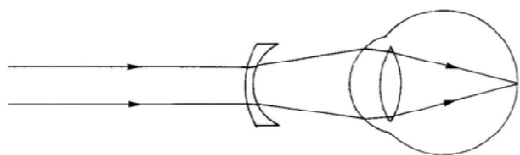
Which of the following statements about short sight is/are correct?

- (1) The curvature of the lens is too great
- (2) Images of distant objects are formed in front of the retina
- (3) A convex lens is used for correction

- | | | | |
|-------------|-------------|---------------------|---------------------|
| A. (1) only | B. (3) only | C. (1) and (2) only | D. (2) and (3) only |
|-------------|-------------|---------------------|---------------------|

5. 1994/II/27

Questions 5 and 6 refer to the diagram below which shows the path of light rays from a distant object to a defective eye through a corrective lens:



What is the likely cause of this eye defect?

- A. The eyeball is too long. B. The lens is too thin.
C. The cornea is not smooth. D. The lens is not elastic.

6. 1994/II/28

Which of the following correctly describes the conditions of different structures of the eyeball?

Ciliary muscles Suspensory ligament Lens

- A. contracted tension increased thick
B. contracted tension decreased thick
C. relaxed tension decreased thin
D. relaxed tension increased thin

7. 1995/II/38

The 'near point' is the nearest point from the eye at which clear vision is possible. The table below shows the change in the position of the near point with age in a person :

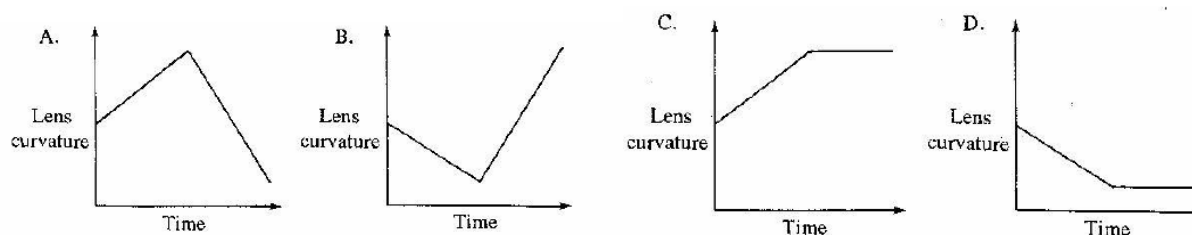
Age (years)	Distance of new point from the eye (cm)
10	7
20	10
30	15
40	22
50	40
60	100

Which of the following can be deduced from the above information? As the person gets older,

- A. his ciliary muscles become weaker. B. the lens of his eyes becomes thicker.
C. he find it more difficult to read newspapers. D. the degree of short-sightedness becomes less serious.

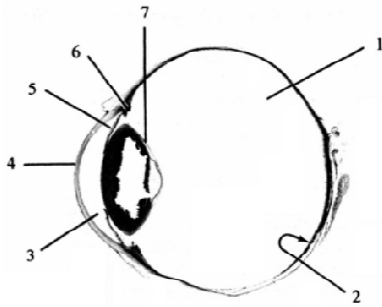
8. 1995/II/39

A boy was watching a bee which was flying towards him and then landed on his nose. Which of the following graphs shows the change in the curvature of the lens of his eye?



9. 1997/II/33

Questions 9 to 11 refer to the photograph below which shows a section of the eye:



Light-sensitive cells are found on structure(s)

- A. 2 only. B. 7 only C. 2 and 5 only. D. 5 and 7 only.

10. 1997/II/34

Which of the following changes occur when a person tries to focus on a distant object?

Structure 6 Structure 7

- | | |
|--------------|-------------|
| A. contracts | more convex |
| B. contracts | less convex |
| C. relaxes | more convex |
| D. relaxes | less convex |

11. 1997/II/35

Which labeled structures help to maintain the shape of the eyeball?

- A. 1 and 2 B. 1 and 3 C. 2 and 4 D. 3 and 4

12. 1997/II/38

Which of the following statements is correct?

- A. A cloudy lens forms dim images.
 B. Defects in cones result in night blindness.
 C. A long-sighted person cannot see distant objects clearly.
 D. If a person cannot distinguish colour at night time, he suffers from colour blindness.

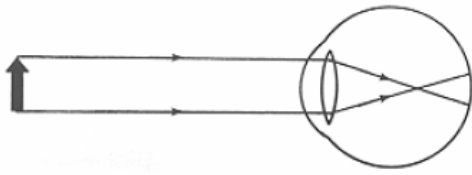
13. 1999/II/30

When you are reading through a page, only a few words can be seen clearly each time. This is because

- A. only a few words can be focused onto the retina each time.
 B. only a few words can be focused onto the yellow spot each time.
 C. some words are focused onto the blind spot.
 D. the brain can only interpret a few words each time.

14. 1999/II/33

The diagram below was drawn by a student to show the path of light rays when a short-sighted person was looking at a distant object :

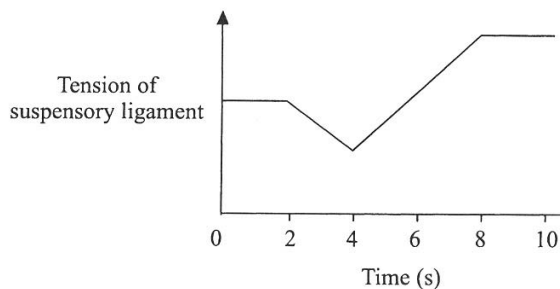


What is wrong with this diagram?

- A. The rays should be focused on the retina. B. The rays should be focused behind the retina.
C. The rays from the object should be diverging. D. The object should not be shown.

15. 2002/II/48

Questions 15 and 16 refer to the graph below, which shows the changes in the tension of the suspensory ligament of a student's eye in 10 seconds :

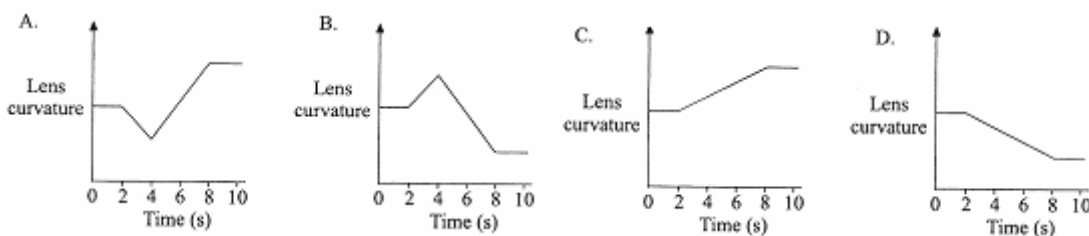


During which period was the student looking at an object moving towards him ?

- A. 0 – 2 second B. 2 – 4 second C. 4 – 8 second D. 8 – 10 second

16. 2002/II/49

Which of the following graphs represents the corresponding changes in the curvature of the lens of the student in these 10 seconds ?



17. 2002/II/59

In a kind of operation, a laser beam is used to reduce the curvature of the cornea of the eye. What is the purpose of this operation ?

- A. to decrease the ability of the eye to bend light rays B. to increase the ability of the eye to bend light rays
C. to decrease the amount of light entering the eye D. to increase the amount of light entering the eye

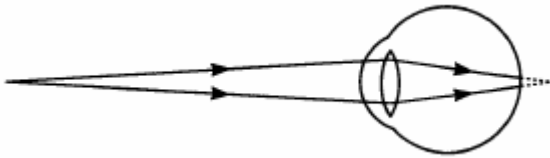
18. 2004/II/36

When a person is watching a bus moving away from him, the suspensory ligaments of his eyes will

- A. contract B. relax C. increase in tension D. decrease in tension

19. 2004/II/50

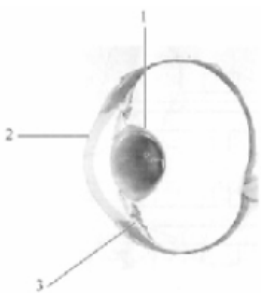
What condition is shown by the ray diagram below?



- A. a short-sighted person looking at a distant object B. a long-sighted person looking at a distant object
C. a short-sighted person looking at a nearby object D. a long-sighted person looking at a nearby object

20. 2005/II/23

Questions 20 and 21 refer to the following photograph of a section of the eye:



Which of the following statements about structures 1 and 2 is incorrect?

- A. Both structures are transparent
B. Both structures refract light that enters the eye
C. The aqueous humour supplies nutrients to both structures
D. The curvature of both structures will change during accommodation of the eye

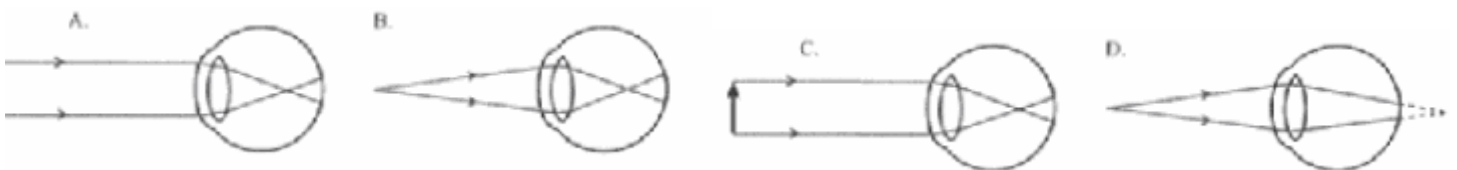
21. 2005/II/24

The muscle of structure 3 will relax when a person

- A. is looking at a distant object B. is looking into a microscope
C. goes from bright sunlight into a dark room D. goes out of a dark room into bright sunlight

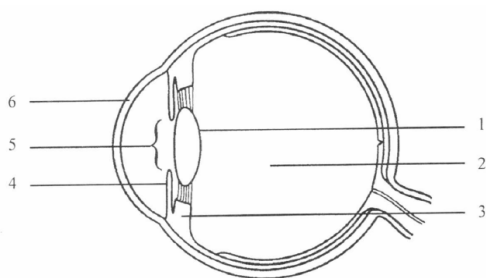
22. 2005/II/51

Which of the following diagrams correctly shows a short-sighted condition?



23. 2006/II/10

Question 23 and 24 refer to the diagram below, which shows a horizontal section of a human eye:



Which of the following are effectors involved in forming a clear image when a person changes his/her focus from a distant object to a close object?

- A. 1 and 3 B. 1 and 5 C. 3 and 4 D. 4 and 5

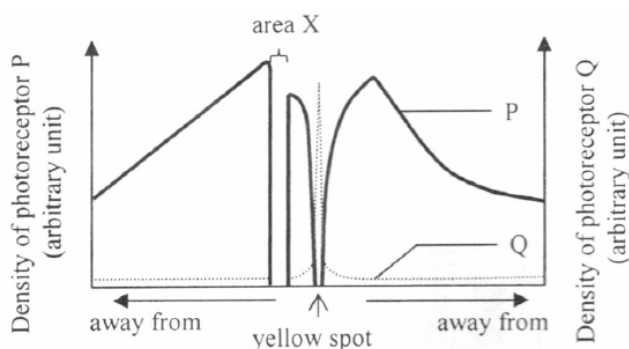
24. 2006/II/11

Which of the above labeled structure is/are involved in the convergence of light rays onto the retina?

- A. 1 B. 1 and 2 C. 2 and 6 D. 1, 2 and 6

25. 2006/II/40

Questions 25 and 26 refer to the graph below, which shows the densities of two types of photoreceptors, P and Q, along the horizontal section of the human retina.



Which of the following information allow the identification of the photoreceptors?

- (1) The peak density of photoreceptor P is higher than that of Q
- (2) Photoreceptor P cannot be found at the yellow spot
- (3) Photoreceptor Q has a low density towards the periphery of the retina

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

26. 2006/II/41

Which of the following statements is correct?

- A. No image can be formed on area X
 B. Neurons can be found at the yellow spot
 C. Under bright light condition, only photoreceptor Q is stimulated
 D. Insufficient number of photoreceptor P will result in the difficulty in distinguishing colours

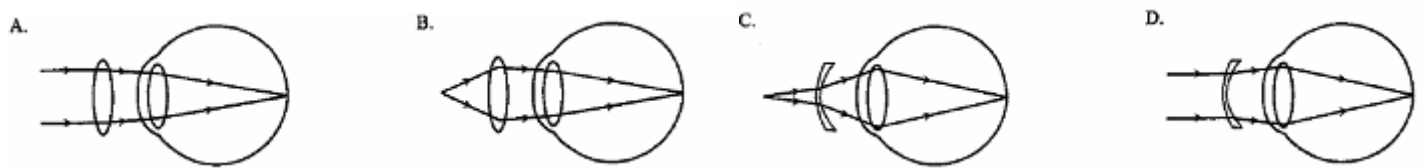
27. 2006/II/42

A person suffers from night blindness and is unable to focus on nearby objects. Which of the following can explain his disabilities?

- A. insufficient cone cells in the retina; eye ball too short
- B. insufficient cone cells in the retina; elasticity of lens increased
- C. insufficient amount of visual purple; eye ball too long
- D. insufficient amount of visual purple; elasticity of lens decreased

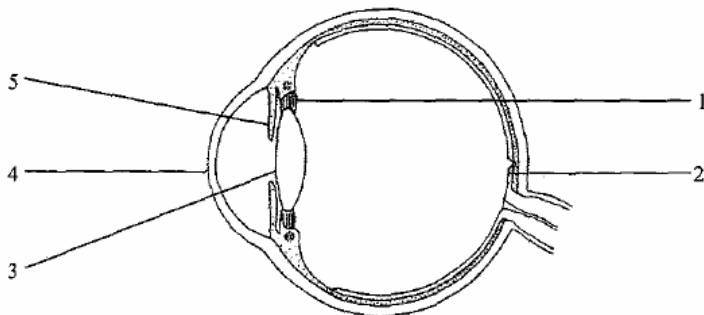
28. 2007/II/48

A long-sighted person is wearing a pair of glasses in order to correct the eye defect. Which of the following ray diagrams represents this situation?



29. 2008/II/47

Questions 29 and 30 refer to the diagram below, which shows the section of the eye:



Which of the following combinations correctly describes the condition of the eye when a long-sighted person is focusing on a near object?

Condition of structure I	Position where the image is focused
A. pulled	in front of structure 2
B. pulled	behind structure 2
C. slackened	in front of structure 2
D. slackened	behind structure 2

30. 2008/II/48

Refraction of light occurs at

- A. surface 4
- B. surfaces 3 and 4
- C. surfaces 3 and 5
- D. surfaces 3,4 and 5

1. 1990/II/19

After a car accident, a man had difficulty in balancing himself when walking but he could still hear well.

Which of the following structures might have been damaged?

- (1) cerebrum
- (2) cerebellum
- (3) cochlea (*Out of syll.*)
- (4) semicircular canals (*Out of syll.*)

- A. (1) and (3) B. (1) and (4) C. (2) and (3) D. (2) and (4)

2. 1991/II/5

Which of the following features of the neuron shown in the diagram below are essential for the coordinating function of an organism?

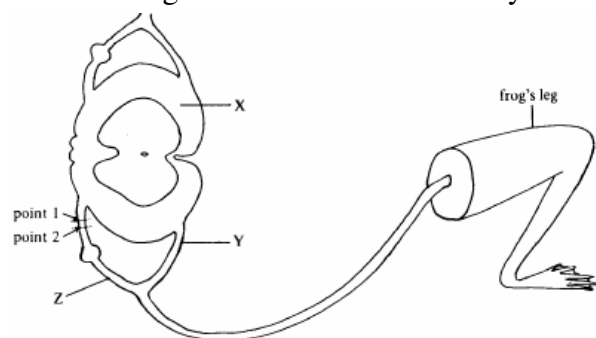


- (1) possession of a nucleus
- (2) long cellular extension
- (3) branched endings

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

3. 1992/II/46

Questions 3 and 4 refer to the diagrammatic representation of a part of the nervous system in a frog. The basic structural organization of the nervous system of a frog is similar to that of a mammal.



The parts labeled X,Y and Z are:

- | X | Y | Z |
|-----------------|--------------|--------------|
| A. white matter | ventral root | dorsal root |
| B. white matter | dorsal root | ventral root |
| C. grey matter | ventral root | dorsal root |
| D. grey matter | dorsal root | ventral root |

4. 1992/II/47

Application of an electric current of suitable strength onto a nerve fibre will set off a nerve impulse. A segment of structure Z between points 1 and 2 is cut and removed. An electric current is then applied at points 1 and 2 in turn. What would be the response of the frog's leg?

- | Point 1 | Point 2 | Point 1 | Point 2 |
|----------------|-------------|----------------|-------------|
| A. contracting | no response | B. no response | contracting |
| C. contracting | contracting | D. no response | no response |

5. 1992/II/48

The flow diagram shows the basic pattern of nervous co-ordination in mammals.

Stimulus → Receptor → X → Effector → Response

X can be

- (1) the cerebrum
 (2) the spinal cord
 (3) the medulla oblongata
- A. (1) only B. (2) only C. (2) and (3) only D. (1),(2) and (3)

6. 1993/II/32

The diagram below shows a sectional view of a part of the human central nervous system:



Which of the following is a correct matching between the structure and its function:

- | Structure | Function |
|-----------|----------------------------------|
| A. 4 | a centre of reflex action |
| B. 3 | a responsible for body balance |
| C. 2 | controlling movement of eyeballs |
| D. 1 | coordinating movement |

7. 1993/II/35

When a drop of sucrose solution was put onto the sides of a boy's tongue, it did not taste sweet to him. It can be concluded that

- A. the boy's tongue is not sensitive to sucrose solution
 B. sucrose solution is not as sweet as glucose solution
 C. no sensory cells for sweetness are present on the sides of the boy's tongue
 D. sensory cells for sweetness are present at the tip of the boy's tongue

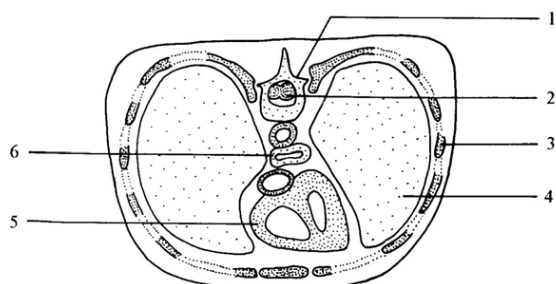
8. 1996/II/29

A patient diagnosed to be a 'vegetable' shows reflex actions, normal heart beat and breathing, but no voluntary responses. Which part of the central nervous system is probably damaged?

- A. cerebrum B. cerebellum C. medulla oblongata D. spinal cord

9. 1996/II/36

Questions 9 and 10 refer to the diagram below which shows a transverse section of the human thorax:



Which structure is responsible for coordinating reflex actions?

- A. 1 B. 2 C. 3 D. 4

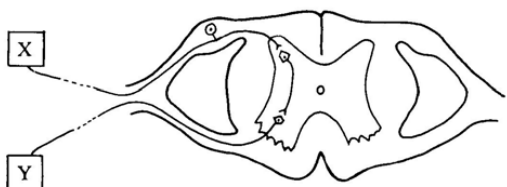
10. 1996/II/37

Which structure can produce red blood cells?

- A. 3 B. 4 C. 5 D. 6

11. 1996/II/38

The diagram below shows a nervous pathway in the human body:



Structures X and Y are probably

- | X | Y |
|-------------------------|-------------|
| A. intercostals muscles | ribs |
| B. pancreas | liver |
| C. skin of finger tips | arm muscles |
| D. tongue | teeth |

12. 1998/II/20

Blind people use their finger tips to read Braille (raised dots), and they drop milk on their wrist to check the temperature of the milk before giving it to babies.

This is because

- A. different parts of the skin interpret different information.
- B. the skin of the finger tips is thicker than that of the wrist.
- C. touch and heat receptors are unevenly distributed on the skin.
- D. there are touch receptors on the finger tips and chemical receptors on the wrist.

13. 1998/II/25

Which of the following are examples of simple reflex action ?

- (1) pulling one's hand from a hot object
- (2) shedding tears when one hears a sad story
- (3) shutting one's eyes as an object approaches the face rapidly

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

14. 1998/II/26

Which of the following correctly matches the stimulus and the location of the corresponding receptors

Stimulus	Location of receptors
A. gravity	cochlea (<i>Out of syll.</i>)
B. light	cornea
C. taste of honey	lips
D. scent of flower	root of nasal cavity

15. 1999/II/34

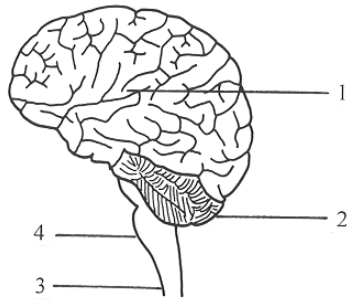
Which of the following parts of the central nervous system are directly involved in some reflex actions ?

- (1) cerebrum
- (2) medulla
- (3) spinal cord

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

16. 2000/II/32

Questions 16 and 17 refer to the diagram below, which shows part of the human central nervous system :



Nerve impulses generated in taste buds are interpreted in

- A. 1. B. 2. C. 3. D. 4.

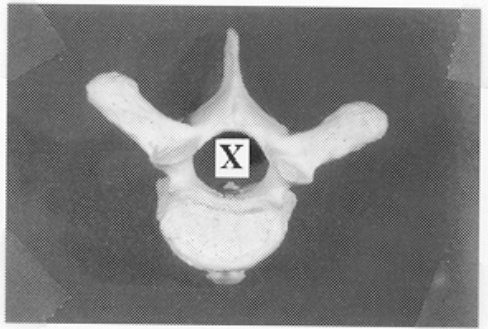
17. 2000/II/33

The movement of the diaphragm is under the control of

- A. 1 and 2. B. 1 and 4. C. 2 and 3. D. 3 and 4.

18. 2001/II/19

The photograph below shows a mammalian vertebra :

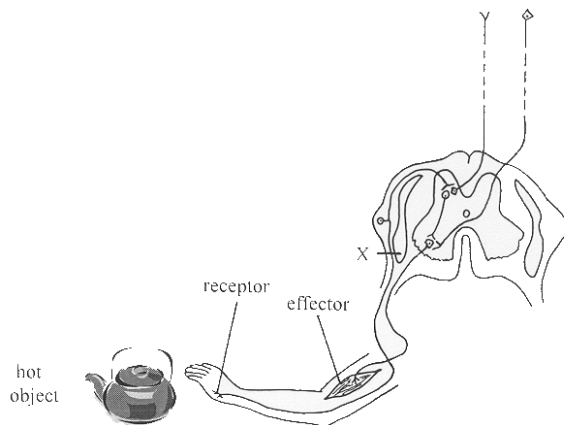


Which of the following is located in position X in a living mammal?

- A. artery B. muscle C. cartilage D. spinal cord

19. 2001/II/27

Questions 19 and 20 refer to the diagram below, which shows the nervous pathway involved in the withdrawal reflex when a person touches a hot object :



How many neurones are involved in this reflex arc?

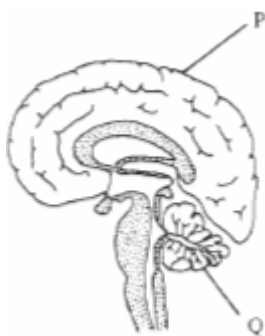
- A. 2 B. 3 C. 4 D. 5

20. 2001/II/28

In an accident, the dorsal root of a man was damaged at position X. What would happen if this man touched a hot object in a dark room ?

	Feel the pain	Withdraw hand immediately
A.	yes	yes
B.	yes	no
C.	no	yes
D.	no	no

21. 2003/II/31



A woman survived a traffic accident but her structure P was partly damaged. Which of the following abilities would probably be lost?

- A. drinking B. knee jerk C. heart beat D. constriction of pupil

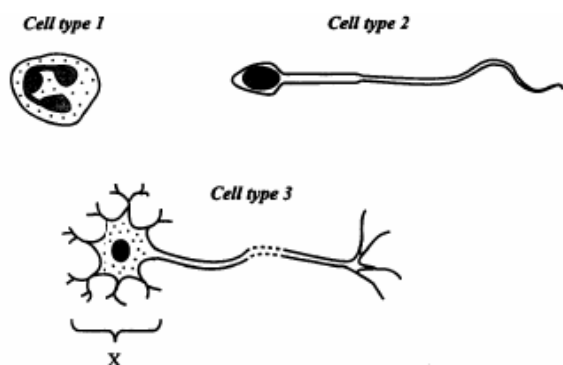
22. 2003/II/56

Which of the following comparisons of the cerebrum and the spinal cord is correct?

- | Cerebrum | Spinal cord |
|--------------------------------|----------------------------|
| A. protected by bones | not protected by bones |
| B. with blood supply | without blood supply |
| C. white matter on the surface | grey matter on the surface |
| D. can generate sensation | cannot generate sensation |

23. 2004/II/23

Questions 23 and 24 refer to the diagram below, which shows three different cell types found in the adult human body:



All three cell types

- | | |
|---------------------------------------|---|
| A. possess a nucleus | B. can move from place to place |
| C. are able to undergo cell divisions | D. contain a diploid set of chromosomes |

24. 2004/II/24

Structure X of cell type 3 is present abundantly in

- | | |
|---------------------------------------|-------------------------------------|
| A. the spinal nerves | B. the skeletal muscles |
| C. the grey matter of the spinal cord | D. the white matter of the cerebrum |

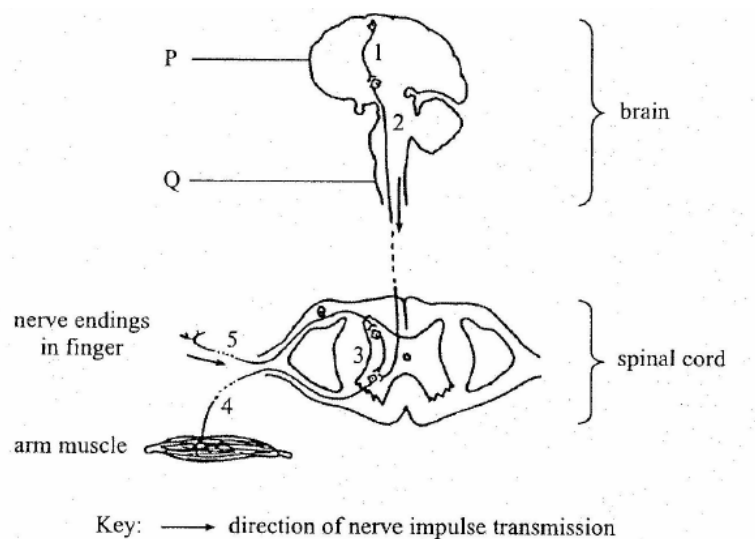
25. 2005/II/26

Which part of the central nervous system coordinates the muscles of a person when he is riding a bicycle?

- | | | | |
|------------|---------------|----------------|----------------------------|
| A. medulla | B. cerebellum | C. spinal cord | D. motor areas of cerebrum |
|------------|---------------|----------------|----------------------------|

26. 2005/II/29

Questions 26 and 27 refer to the diagram below, which shows the arrangement of some neurones in a person:



If neurone 2 were damaged, would the person be able to detect a sharp pick at the finger tip and withdraw his arm by reflex?

	Detection of sharp prick	Withdrawing the arm by reflex
A.	Yes	Yes
B.	Yes	No
C.	No	Yes
D.	No	No

27. 2005/II/30

Which of the following correctly compares structures P and Q?

Structure P	Structure Q
A. grey matter inside	grey matter outside
B. protected by bone	not protected by bone
C. controlling voluntary actions	controlling involuntary actions
D. receiving food from cerebrospinal fluid	not receiving food from cerebrospinal fluid

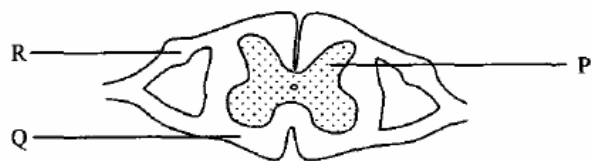
28. 2005/II/31

Which of the following responses does not involve the brain as the coordinating centre?

- A. playing the piano
- B. increase in heart rate during exercise
- C. constriction of the pupil under bright light
- D. kicking up the lower leg when the knee cap is tapped

29. 2007/II/26

The diagram below shows a cross section of the spinal cord. At which part(s) of the spinal cord can synapses be found?



- A. P B. Q C. P and R D. Q and R

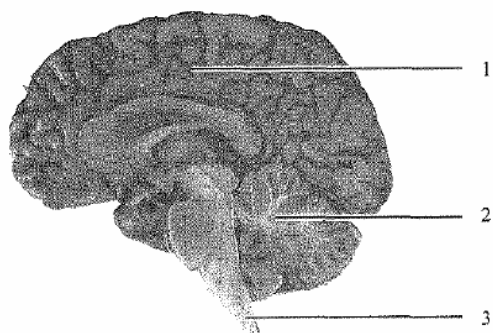
30. 2007/II/27

John has some problems in his nervous system. When he is blindfolded and the finger of his left hand is pricked with a needle, he cannot feel the pain and does not withdraw his hand. However, he can move his left arm voluntarily. Which of the following components of the corresponding reflex arc is/are probably damaged?

- A. interneurone B. sensory neurone C. motor neurone D. motor and sensory neurone

31. 2007/II/28

The photograph below shows part of the human central nervous system.

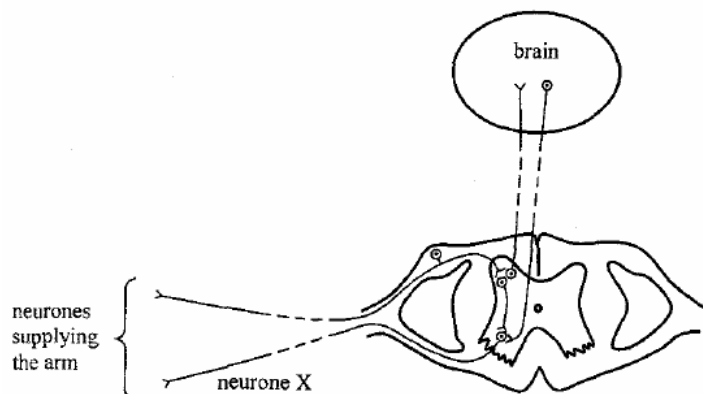


The movement of the legs is under the coordination of

- A. 1 and 2 B. 1 and 3 C. 2 and 3 D. 1, 2 and 3

32. 2008/II/10

Questions 32 and 33 refer to the diagram below, which shows the arrangement of some neurones in the nervous system:



A person touches a hot object and withdraws his hand immediately. How many neurones are involved in this action?

- A. 2 B. 3 C. 4 D. 5

33. 2008/II/11

Which of the following is connected to the type of neurone which is the same as X?

- A. the skin B. the pupil C. a tooth D. a taste bud

34. 2008/II/12

Which of the following correctly describes the function of cerebrospinal fluid?

- (1) It fills up the cavities of the brain
(2) It nourishes the brain cells
(3) It acts as a shock absorber

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

35. 2008/II/49

Which of the following comparisons about voluntary action and simple reflex action is incorrect?

Voluntary action

- A. not inborn
B. may involve a stimulus
C. we are aware of the action taken place
D. the same stimulus may lead to different response

Simple reflex action

- inborn
involves a stimulus
we are not aware of the action taken place
the same stimulus leads to same response

1. 1997/II/31

Which of the following statements about a hormone are correct?

- (1) It is transported in the blood.
- (2) It affects only one target organ.
- (3) It is secreted by a ductless gland.

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

2. 2005/II/50

A hormone differs from an enzyme in that

- A. it is not made up of protein
- B. it is produced by a gland
- C. it is carried by blood to the target organ
- D. it catalyses a wide range of metabolic reactions

3. 2005/II/59

Which of the following process is controlled by hormones?

- A. combination of antibodies with antigens
- B. emulsification of fat in the small intestine
- C. development of mammary glands at puberty
- D. breakdown of excess amino acids in the liver

4. 2006/II/51

In humans, which of the following is/are under the influence of hormones?

- (1) production of sperms
- (2) shivering
- (3) uptake of glucose into body cells

A. (1) only B. (1) and (2) only C. (1) and (3) only D. (2) and (3) only

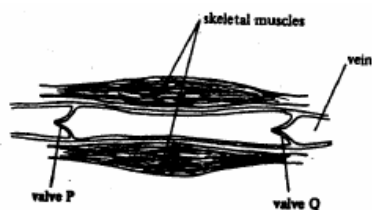
5. 2006/II/52

Which of the following statements about hormones is correct?

- A. The effect of glucagons is localized
- B. The target sites of sex hormones are specific
- C. All hormones are made of polypeptides
- D. Insulin is released from the pancreas through the pancreatic duct

1. 1990/II/34

The diagram below shows a small part of a vein and its neighbouring skeletal muscles in longitudinal section:

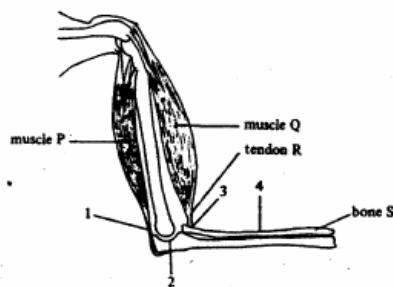


Which of the following correctly matches the state of the muscles with the corresponding conditions of valves P and Q?

	skeletal muscle	valve P	valve Q
A.	contracting	open	closed
B.	contracting	closed	open
C.	relaxing	open	closed
D.	relaxing	open	open

2. 1990/II/40

Questions 2 to 4 refer to the diagram below which represents the relative positions of the bones, associated muscles and tendons of the human arm:



What is the advantage of having the tendon R attached to position 3 rather than to position 4 of the bone S?

- A. to provide a stronger surface for tendon attachment
- B. to produce a greatest movement when muscle Q contracts
- C. to prevent dislocation of the joint
- D. to counteract the condition of muscle P more effectively

3. 1990/II/41

Which of the following happens when muscle Q contracts?

- A. Muscle P increases in length
- B. Muscle Q decreases in thickness
- C. The tension on tendon R is reduced
- D. The arm straightness out

4. 1990/II/42

Cartilage is found at

- A. position 1
- B. position 2
- C. position 3
- D. position 4

5. 1991/II/29

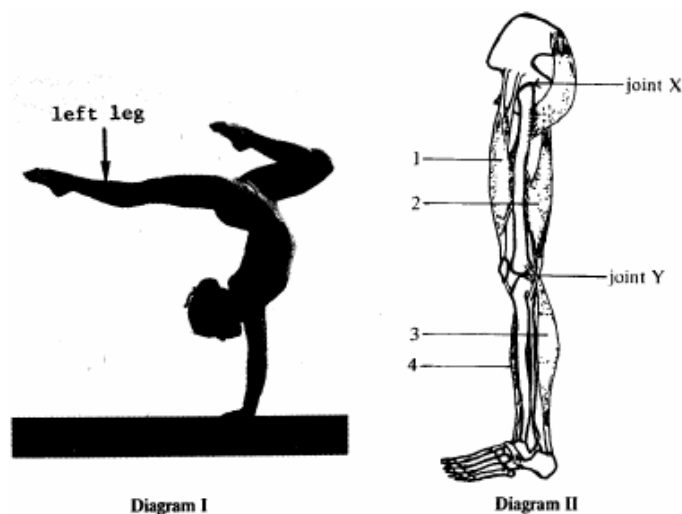
Which of the following descriptions about skeletal muscles are correct?

- (1) They are attached to bones by ligaments
- (2) Their activities are usually under voluntary control
- (3) They become fatigued easily during exercise

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

6. 1992/II/31

Questions 6 and 7 refer to the diagrams I and II below. Diagram I shows a girl maintaining a posture on a balance bema. Diagram II shows some muscles associated with her leg.



Which of the following muscles in the girl's left leg are contracting when she keeps such a posture?

A. (1) and (3) only B. (1) and (4) only C. (2) and (3) only D. (2) and (4) only

7. 1992/II/32

The degree of movement allowed in joints X and Y are:

Joint X **Joint Y**

- A. in one plane in one plane
- B. in one plane in all plane
- C. in all plane in one plane
- D. in all plane in all plane

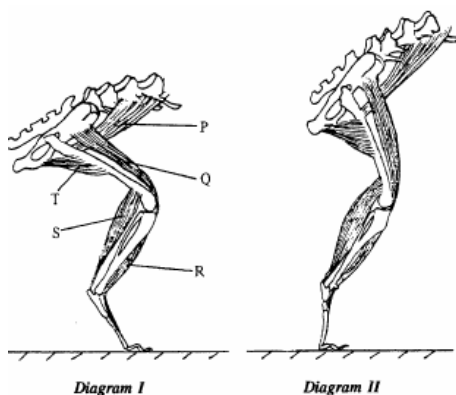
8. 1992/II/33

Which of the following statements about two successive vertebrae is true?

- A. They are packed tightly without any space
- B. There is a fluid-filled space to reduce friction
- C. There is a small disc of bone to reduce friction
- D. They are held together by muscles and ligaments

9. 1993/II/37

Questions 9 and 10 refer to the diagrams below which show the conditions of certain muscles associated with the hind limb of a rabbit. Diagram I shows the conditions when the rabbit is about to jump. Diagram II shows the condition at a later stage when the rabbit's hind limb is about to lift off from the ground:



Which muscles contract to effect a change from the condition shown in Diagram I to that in Diagram II?

- A. P, Q and R B. P, Q and S C. P, R and T D. Q, S and T

10. 1993/II/38

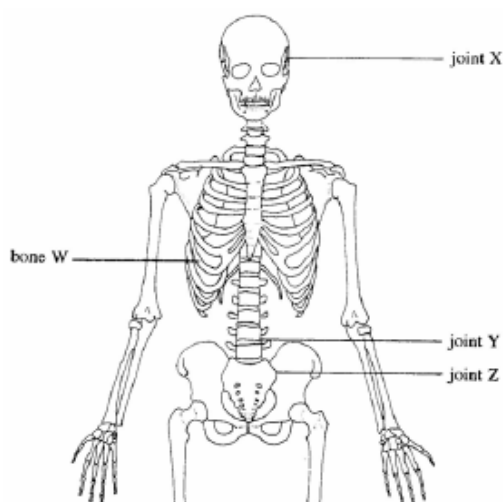
Apart from the structures labelled, which of the following are essential for support in the rabbit?

- (1) bone (2) tendons (3) ligaments

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

11. 1994/II/33

Questions 11 and 12 refer to the diagram below which shows part of the human skeleton:



Which of the following functions are carried out by bone W?

- (1) producing red blood cells
(2) helping in ventilation of the lungs
(3) protecting internal organs

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

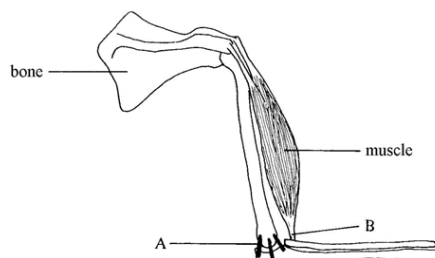
12. 1994/II/34

Which of the joints X, Y and Z allow(s) movement between the bones?

- A. Y only B. Z only C. X and Y only D. Y and Z only

13. 1994/II/35

Questions 13 and 14 refer to the diagram below which shows some structures associated with the elbow joint:



Which comparison between structures A and B is correct?

Structure A**Structure B**

- | | |
|---|--|
| A. rigid | soft |
| B. elastic | not elastic |
| C. can stand a high tension | cannot stand a high tension |
| D. contains a large amount of calcium salts | contains a small amount of calcium salts |

14. 1994/II/36

Which of the following correctly describes the functions of structures A and B?

Structure A**Structure B**

- | | |
|-----------------------------------|-------------------------------------|
| A. holding the bones together | transmitting force to the bone |
| B. acting as a pivot | protecting the joint |
| C. protecting the joint | preventing dislocation of the joint |
| D. transmitting force to the bone | acting as a pivot |

15. 1994/II/37

The diagram below shows a man at a certain stage of swimming:



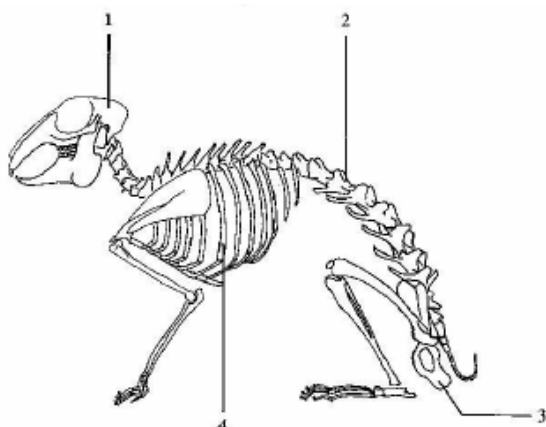
Which of the following combinations correctly describes the conditions of his arm muscles at this stage?

Left arm**Right arm****Biceps****Triceps****Biceps****Triceps**

- | | | | |
|---------------|------------|------------|------------|
| A. contracted | relaxed | relaxed | contracted |
| B. relaxed | contracted | contracted | relaxed |
| C. contracted | relaxed | contracted | relaxed |
| D. relaxed | contracted | relaxed | contracted |

16. 1995/II/31

Question 16 and 17 refer to the diagram below which shows the skeleton of a rabbit :



Which structures are parts of the axial skeleton?

- A. 1, 2 and 3 B. 1, 2 and 4 C. 1, 3 and 4 D. 2, 3 and 4

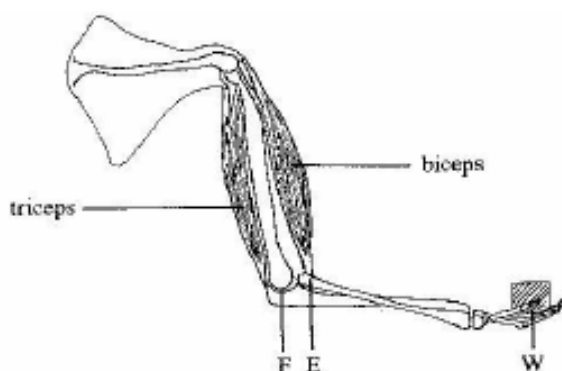
17. 1995/II/32

Which of the following correctly lists the structures protected by the different parts of the skeleton?

- | 1 | 2 | 4 |
|----------|-------------|---------|
| A. brain | aorta | stomach |
| B. ears | aorta | heart |
| C. brain | spinal cord | heart |
| D. ears | spinal cord | stomach |

18. 1995/II/33

The diagram below shows a human arm holding a weight :

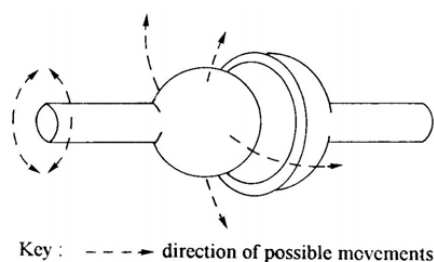


The length of EF is shorter than the length of WF. What is the advantage of this arrangement?

- A. The biceps would not become fatigue easily.
 B. This would make the biceps stronger than the triceps.
 C. Less energy would be used by the biceps in supporting the weight.
 D. A small contraction of the biceps would move the weight through a large distance.

19. 1996/II/34

The diagram below shows a model of a movable joint:

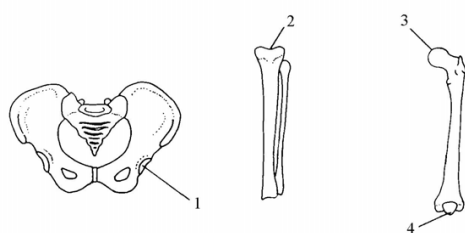


Which of the following combinations is correct?

Type of joint represented by the model	Example
A. hinge joint	knee joint
B. hinge joint	shoulder joint
C. ball and socket joint	shoulder joint
D. ball and socket joint	knee joint

20. 1996/II/35

The diagrams below show three sets of bones of the human skeleton:

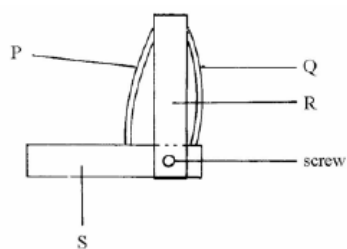


The type of joint shown by the model in question 20 can be formed between

- A. 1 and 3 B. 1 and 4 C. 2 and 3 D. 2 and 4

21. 1996/II/59

Questions 21 and 22 refer to the model below which is used to illustrate the movement at the elbow joint:



Key : P and Q are rubber bands
R and S are wooden planks

Which of the following occurs when Q is shortened?

P	S
A. shortened	raised
B. shortened	lowered
C. stretched	raised
D. stretched	lowered

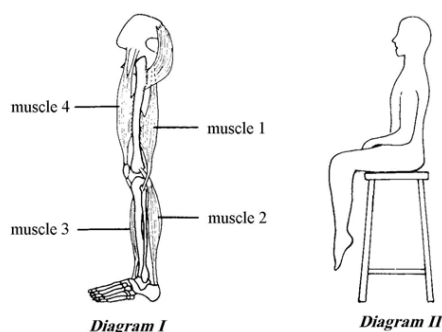
22. 1996/II/60

This model is useful for demonstrating

- A. the movement of the upper arm. B. that the joint allows 360° movement.
C. that the biceps is stronger than the triceps. D. the actions of a pair of antagonistic muscles.

23. 1997/II/27

Questions 23 and 24 refer to the diagrams below. Diagram I shows some muscles attached to the leg bones. Diagram II shows the posture of a person sitting on a stool:



Which muscles in the person's leg are contracted when he maintains the posture shown in the diagram?

- A. muscles 1 and 2 only B. muscles 1 and 3 only
C. muscles 2 and 4 only D. muscles 3 and 4 only

24. 1997/II/28

Which of the following are involved in maintaining his posture?

- (1) skeletal muscles
(2) bones
(3) ligaments
(4) nervous system

- A. (1) and (2) only B. (3) and (4) only C. (1), (2) and (3) only D. (1), (2), (3) and (4)

25. 1997/II/37

Which of the following is not a function of the mammalian skeleton?

- A. storage of fat B. storage of calcium
C. destruction of red blood cells D. production of white blood cells

26. 1998/II/30

Questions 26 and 27 refer to the diagrams below. Diagram I show an athlete in action. Diagram II shows some muscles associated with her leg :

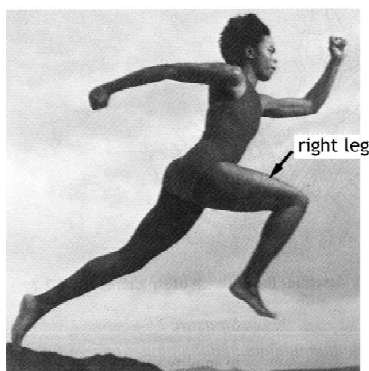


Diagram I

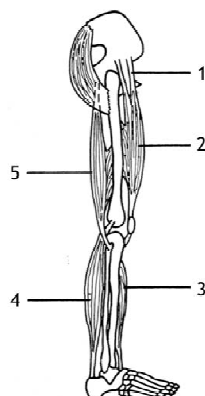


Diagram II

Which of the following statements about structure 1 is correct?

- A. It is elastic. B. It transmits force.
C. It generates force. D. It becomes shorter when structure 2 contracts.

27. 1998/II/31

In diagram I, which muscles in the right leg of the athlete are contracting?

- A. 2 and 3 B. 2 and 4 C. 3 and 5 D. 4 and 5

28. 1999/II/31

Questions 28 and 29 refer to diagrams I and II below. Diagram I shows a certain posture of a dancer. Diagram II shows some of the muscles associated with her right leg.



Diagram I

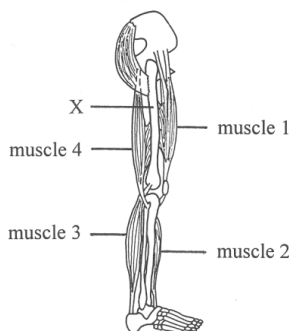


Diagram II

Which muscles of the right leg of the dancer are contracting when she maintains the posture shown in diagram I?

- A. muscles 1 and 2 B. muscles 1 and 3 C. muscles 2 and 4 D. muscles 3 and 4

29. 1999/II/32

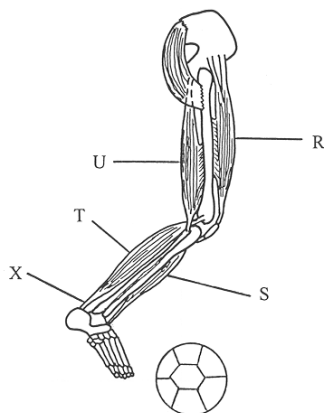
Which of the following can be found in structure X?

- (1) vitamin D (2) living cells (3) calcium salts
A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

30. 2000/II/25

Questions 30 and 31 refer to the following information :

A football player is going to kick a ball with his right leg. The diagram below shows his right leg and its associated muscles :



At this moment, which muscles are in the contracted state?

- A. R and S B. R and T C. S and U D. T and U

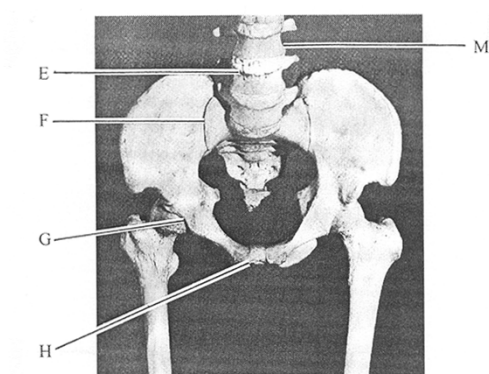
31. 2000/II/26

Which of the following correctly describes structure X ?

- A. It is inelastic. B. It is hard and rigid. C. It is rich in calcium. D. It is able to contract.

32. 2000/II/27

Questions 32 to 34 refer to the photograph below, which shows the hip girdle and the associated structures :



Which joints allow movement between the bones?

- A. E and F B. E and G C. F and H D. G and H

33. 2000/II/28

Which of the following is not a function of bone M ?

- A. formation of white blood cells B. breakdown of old red blood cells
C. protection of the central nervous system D. providing surfaces for muscle attachment

34. 2000/II/29

In a pregnant woman, which of the following may be supplied by bone M for the growth of the foetus?

- A. blood cells B. protein C. iron D. calcium

35. 2001/II/3

Which of the following are the functions of ribs?

- (1) supporting body weight
(2) producing red blood cells
(3) protecting internal organs

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

36. 2001/II/20

Skeletal muscles usually work in pairs because

- A. a pair of muscles is stronger than a single muscle.
B. when one muscle is damaged, the other can still function.
C. the two muscles of the same pair cannot contract at the same time.
D. two muscles are required for producing movements in opposite directions.

37. 2001/II/22

Questions 37 to 39 refer to the table below, which shows the blood flow to the skeletal muscle and an organ, X, at rest and during exercise :

	Blood flow (mL min^{-1})	
	At rest	During exercise
Skeletal muscle	1 200	12 500
Organ X	500	2 000

Blood flow to the skeletal muscle increases during exercise to

- (1) remove more urea from the muscle.
(2) carry more heat away from the muscle.
(3) increase the oxygen supply to the muscle.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

38. 2001/II/23

Which of the following is not a cause for the increase in blood flow to the skeletal muscle during exercise ?

- A. increase in heart rate B. increase in breathing rate
C. increase in blood pressure D. dilation of arterioles in the muscle

39. 2001/II/24

Organ X may be

- A. the skin. B. the brain. C. the kidney. D. the small intestine.

40. 2002/II/34

Which of the following cell types is/are capable of locomotion?

- (1) ovum
- (2) phagocyte
- (3) motor neurone

A. (2) only B. (3) only C. (1) and (2) only D. (1) and (3) only

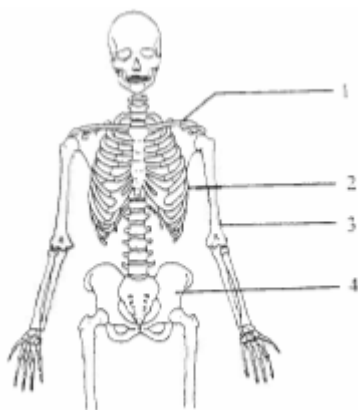
41. 2002/II/47

When there is bone fracture, the broken parts can reconnect and the bone heals after some time. This shows that

- A. bone is a living tissue.
- B. bone growth is unlimited.
- C. bone can respond to an external stimulus.
- D. the healing of the bone is an immune response.

42. 2003/II/21

Questions 42 and 43 refer to the diagram below, which shows part of the human skeleton:



Which structure are parts of the appendicular skeleton?

- A. 2 and 3 B. 3 and 4 C. 1, 2 and 4 D. 1, 3 and 4

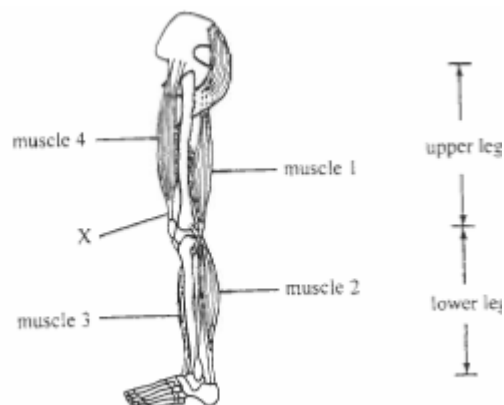
43. 2003/II/22

Which of the following is not a function of structure 2?

- A. assisting ventilation
- B. storing red blood cells
- C. giving shape to the body
- D. protecting internal organs

44. 2003/II/33

Questions 44 and 45 refer to the diagram below, which shows some muscles of the leg:



Which of the following muscles are flexors?

- A. 1 and 2 B. 1 and 3 C. 2 and 4 D. 3 and 4

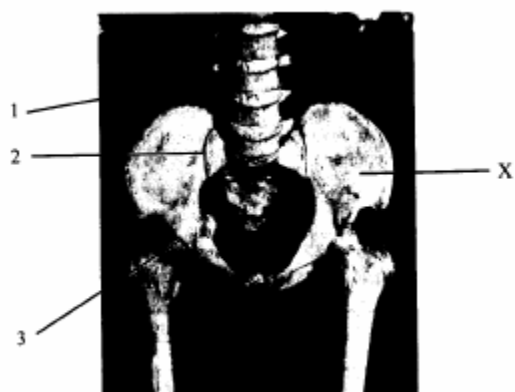
45. 2003/II/34

If structure X is broken, which of the following will occur?

- A. The lower leg cannot move properly
 B. The upper leg cannot move properly
 C. The knee joint can move in many planes
 D. When muscle 1 contracts, muscle 4 becomes extended

46. 2004/II/6

Questions 46 and 47 refer to the photograph below, which shows part of the human skeleton:



Which joints allow movement between the bones?

- A. 1 and 2 B. 1 and 3 C. 2 and 3 D. 1, 2 and 3

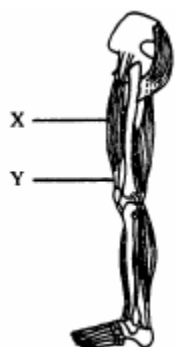
47. 2004/II/7

Which of the following is a function of structure X?

- A. storing iron B. protecting the spinal cord
 C. destroying red blood cells D. producing white blood cells

48. 2004/II/26

Questions 48 and 49 refer to the diagram below, which shows the muscles associated with the leg of a person:



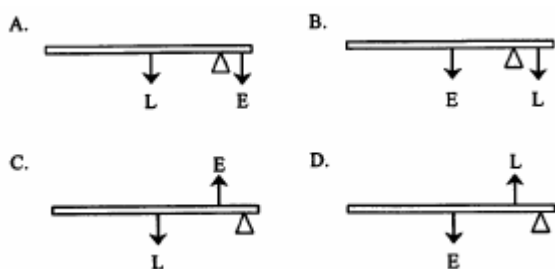
When X contracts, Y will

- (1) become shorter
- (2) become thicker
- (3) increase in tension

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

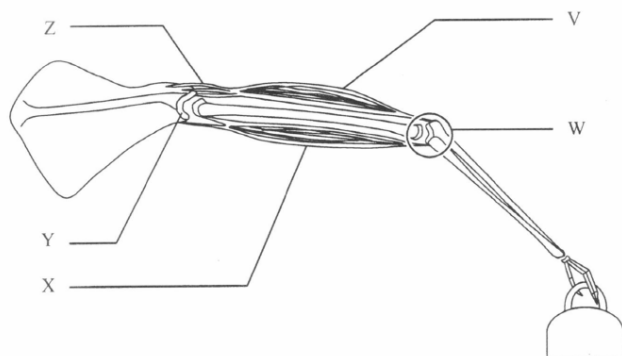
49. 2004/II/27

Which of the following correctly represents the lever system involved in the straightening of the leg at the knee joint? (Key: E = effort; L = load)



50. 2006/II/7

Questions 50 and 51 refer to the diagram below, which illustrates a human arm holding a case:



While holding the case and maintaining the position as shown in the diagram,

- A. V is contracting and Z is shortened
- B. V is contracting and Z is under tension
- C. X is contracting and Z is lengthened
- D. X is contracting and Z is slackened

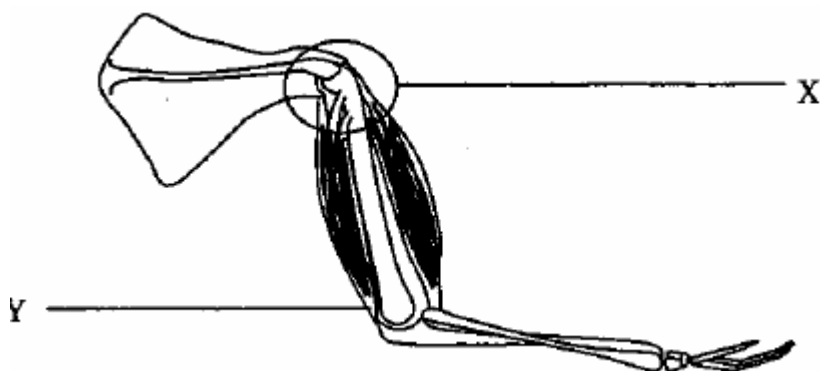
51. 2006/II/8

Which of the following correctly describes the functions of structures W and Y?

Structure W	Structure Y
A. allows movement in one plane	reduces friction during movement
B. allows movement in one plane	produces fluid for lubrication
C. allows movement in all planes	reduces friction during movement
D. allows movement in all planes	produces fluid for lubrication

52. 2007/II/33

Questions 52 and 53 refer to the diagram below, which shows the skeleton and the associated muscles of a human upper limb.



Which of the following correctly describes joint X?

- A. The ends of the bones at X are ball-shaped
- B. The degree of movement at X increases with age
- C. X is surrounded by ligaments to reduce the chance of dislocation
- D. X is a hinge joint because it allows the upper limb to move in a single plane

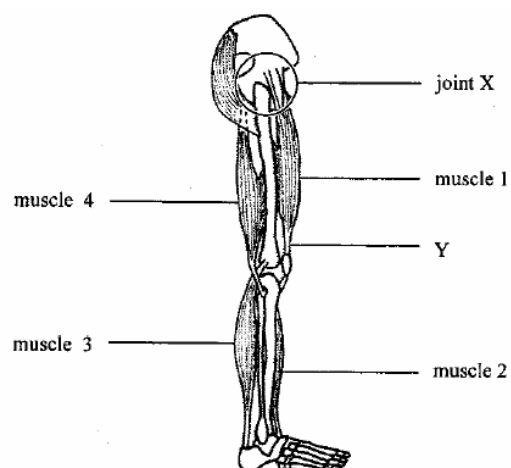
53. 2007/II/34

Which of the following is a correct describes of structure Y?

Property	Importance during movement
A. elastic	allows the attached bones to move more freely
B. inelastic	transmits forces to bone with minimum loss
C. rich in protein	creates a smooth surface to reduce friction
D. rich in glucose	release more energy for muscle contraction

54. 2008/II/19

Questions 54 and 55 refer to the diagram below, which shows some of the muscles associated with a leg:



Which of the following combinations correctly identifies X and Y?

- | X | Y |
|--------------------------|----------|
| A. ball and socket joint | tendon |
| B. ball and socket joint | ligament |
| C. hinge joint | tendon |
| D. hinge joint | ligament |

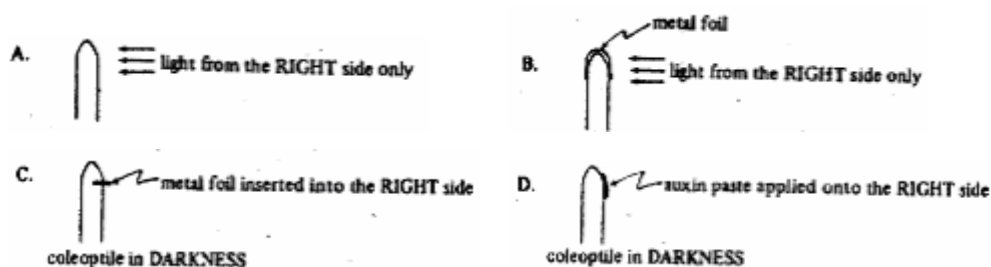
55. 2008/II/20

Which of the following muscles are flexors?

- A. 1 and 2
- B. 1 and 3
- C. 2 and 4
- D. 3 and 4

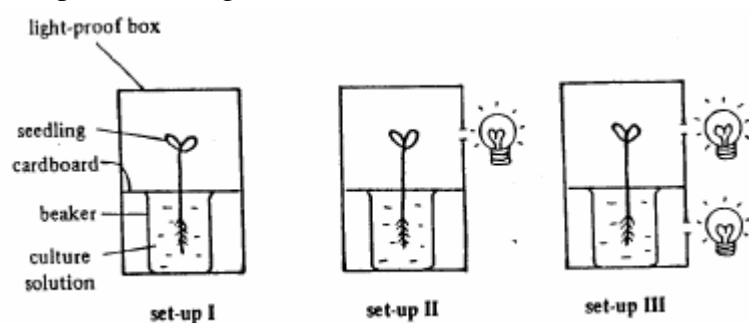
1. 1990/II/46

Which of the following treatments shown below results in the oat coleoptiles bending towards the LEFT side?

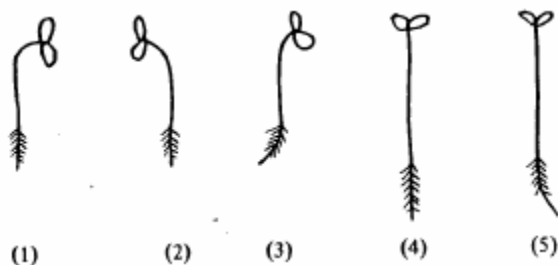


2. 1991/II/40

Questions 2 and 3 refer to the diagram below which shows the experiment set-ups used to study the growth response of plant seedlings:



After a few days, the appearance of the plant seedlings in the three set-ups would be



Set-up I Set-up II Set-up III

- | | | |
|--------|-----|-----|
| A. (1) | (2) | (4) |
| B. (2) | (4) | (5) |
| C. (4) | (1) | (3) |
| D. (5) | (3) | (1) |

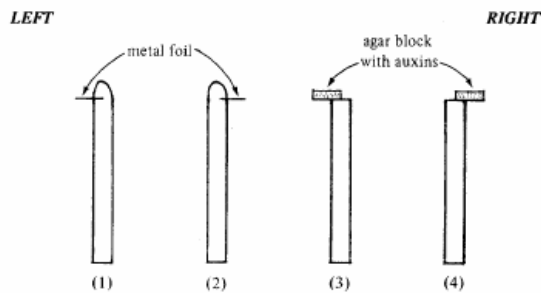
3. 1991/II/41

The result of set-up I demonstrates

- A. etiolation
- B. geotropism
- C. positive phototropism
- D. negative phototropism

4. 1993/II/30

Four coleoptiles, treated as show below, are placed in the dark:

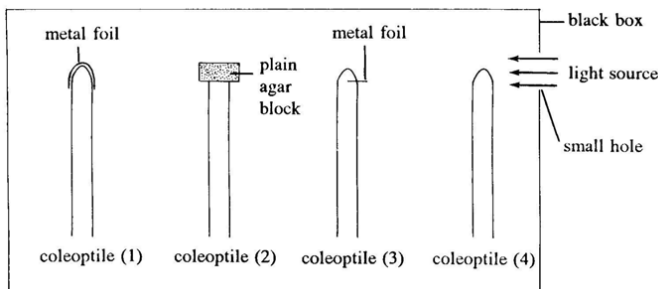


Which coleoptiles will bend towards the right hand side?

- A. (1) and (3)
- B. (1) and (4)
- C. (2) and (3)
- D. (2) and (4)

5. 1994/II/31

Questions 5 and 6 refer to the diagram below which shows an experimental set-up to study the effect of light on the growth of oat coleoptiles:



Which coleoptiles will bend towards the light source?

- A. Coleoptiles (1) and (2) only
- B. Coleoptiles (3) and (4) only
- C. Coleoptiles (1), (2) and (4) only
- D. Coleoptiles (2), (3) and (4) only

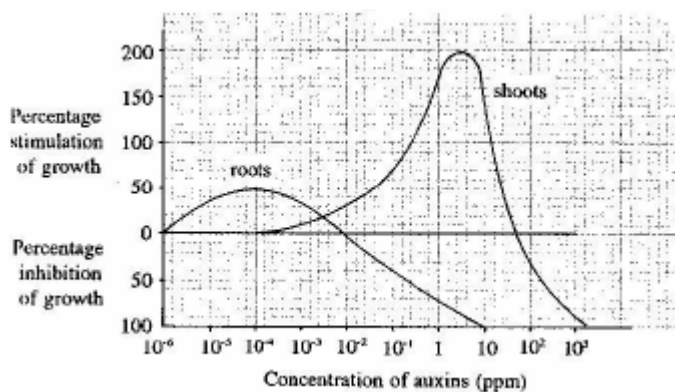
6. 1994/II/32

If the hole of the black box is covered up, which of the following is correct with regard to the growth of the coleoptiles?

- A. Coleoptiles (1) will grow fastest.
- B. Coleoptiles (4) will stop growing.
- C. Coleoptiles (2) and (3) will show bending.
- D. Coleoptiles (1) and (4) will grow vertically upward.

7. 1995/II/40

Question 7 and 8 refer to the graph below which shows the effect of auxin concentration on the growth roots and shoots :



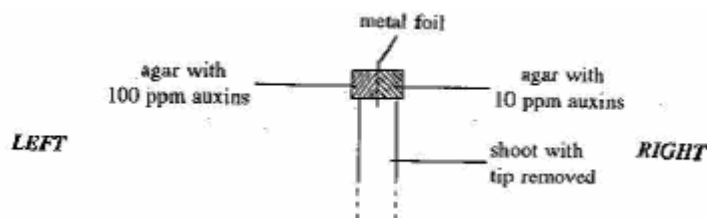
What is the effect of auxins at a concentration of 10^{-3} ppm on the growth of roots and shoots?

Growth of roots**Growth of shoots**

- | | |
|---------------|------------|
| A. stimulated | stimulated |
| B. stimulated | inhibited |
| C. inhibited | stimulated |
| D. inhibited | inhibited |

8. 1995/II/41

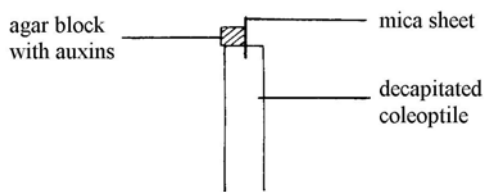
Predict the growth of the shoot when two pieces of agar with different concentrations of auxins are placed on its tip as shown below :



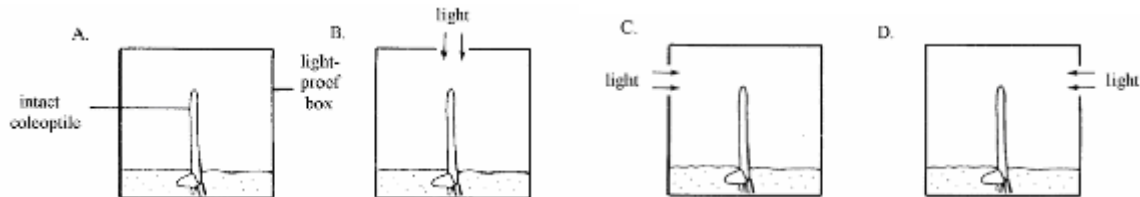
- | | |
|-----------------------------------|------------------------------------|
| A. It will grow towards the left. | B. It will grow towards the right. |
| C. It will grow straight upwards. | D. It will not grow at all. |

9. 1997/II/36

In a set-up, the tip of a coleoptiles was removed and the coleoptiles was treated as shown in the diagram below:

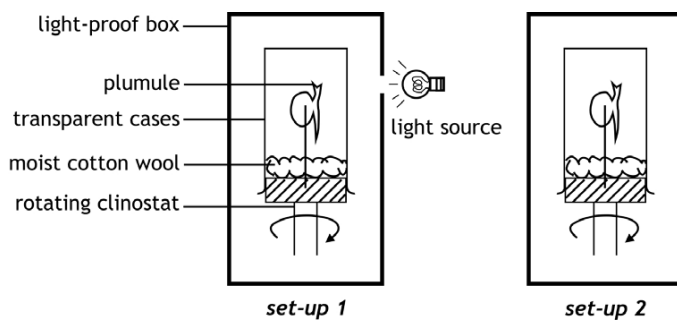


Which of the following set-ups will give a similar result as the one above?



10. 1998/II/38

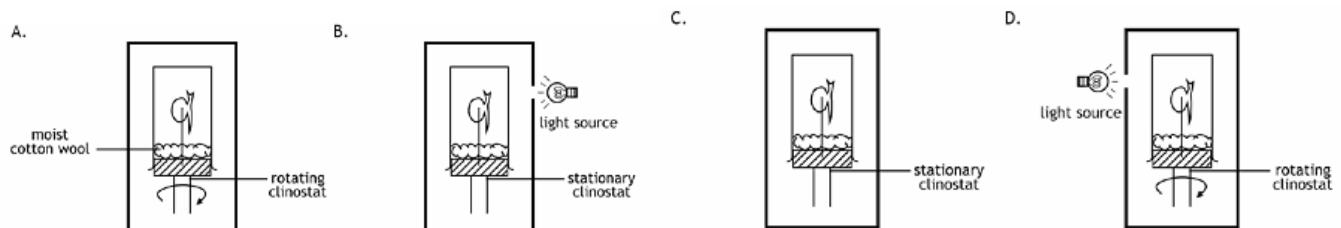
Questions 10 and 11 refer to the diagram below which shows two clinostats set up by a student. Both clinostats were rotating throughout the investigation.

**Set-up 1****Set-up 2**

- | | |
|----------------------|------------------|
| A. no bending | no bending |
| B. no bending | bend to one side |
| C. bend to the right | no bending |
| D. bend to the right | bend to one side |

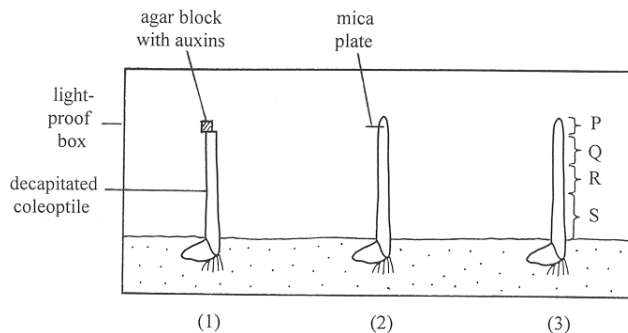
11. 1998/II/39

In order to study the phototropic response of the plumule, which of the following set-ups should be used for comparison with set-up 1?



12. 2000/II/35

Questions 12 and 13 refer to the diagram below, which shows three oat seedlings growing in a light-proof box. The coleoptile of the seedlings are treated in different ways as shown in the diagram :

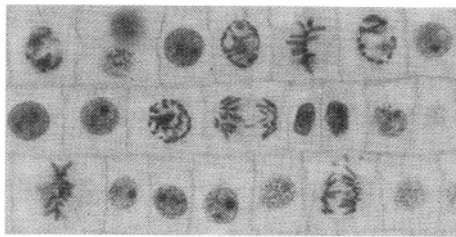


Which coleoptile(s) would grow towards the right side?

- A. (1) only B. (2) only C. (1) and (2) only D. (1), (2) and (3)

13. 2000/II/36

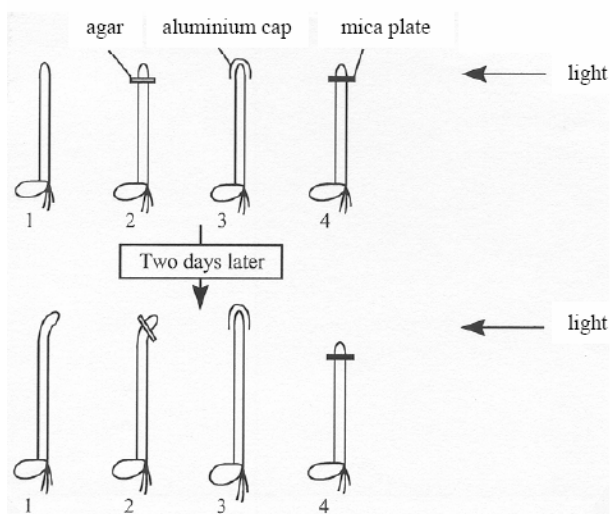
Referring to coleoptile (3), the cells in the photomicrograph below are most likely to be taken from



- A. region P B. region Q C. region R D. region S

14. 2001/II/29

Questions 14 and 15 refer to the diagram below, which shows four oat seedlings growing under unilateral light :



A scientist concluded that the tip of the coleoptile is sensitive to light. His conclusion was based on a comparison of the results of seedlings

- A. 1 and 3 B. 1 and 4 C. 2 and 3 D. 2 and 4

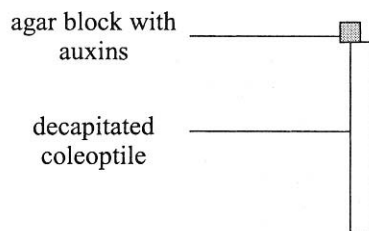
15. 2001/II/30

Which seedlings would enable the scientist to conclude that there may be a growth-promoting substance passing from the tip to the growing region of the coleoptile?

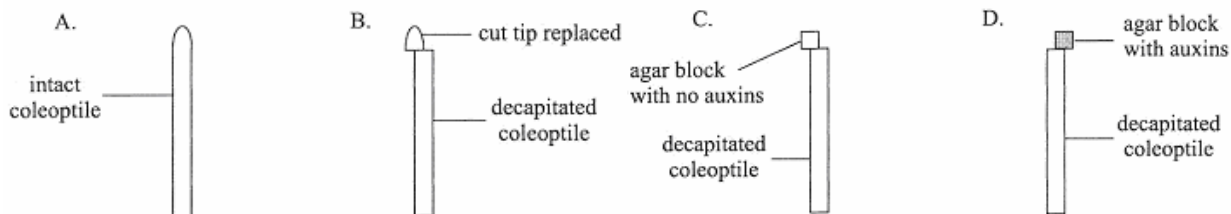
- A. 1, 2 and 3 B. 1, 2 and 4 C. 1, 3 and 4 D. 2, 3 and 4

16. 2002/II/46

The diagram below shows a set-up used to test the hypothesis that auxins are growth-promoting substances in oat coleoptile :

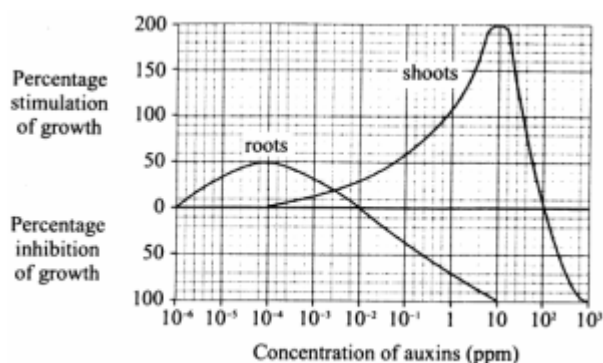


Which of the following is the control set-up of this investigation?



17. 2003/II/50

Questions 17 and 18 refer to the graph below, which shows the effect of auxin concentration on the growth of roots and shoots:

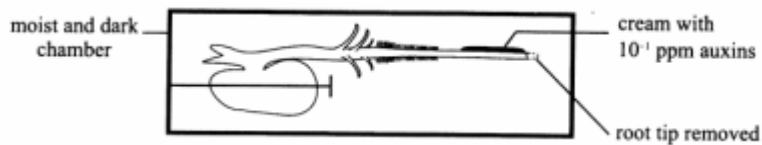


Which auxin concentration will stimulate growth of both the roots and shoots?

- A. 10^{-6} to 10^{-2} ppm
 B. 10^{-4} to 10^{-2} ppm
 C. 10^{-4} to 10 ppm
 D. 10^{-6} to 10^{-2} ppm

18. 2003/II/51

A bean seedling, with its root tip removed, was pinned in a moist and dark chamber. A paste of cream containing 10^{-1} ppm auxins was smeared on one side of the root as shown in the diagram below:

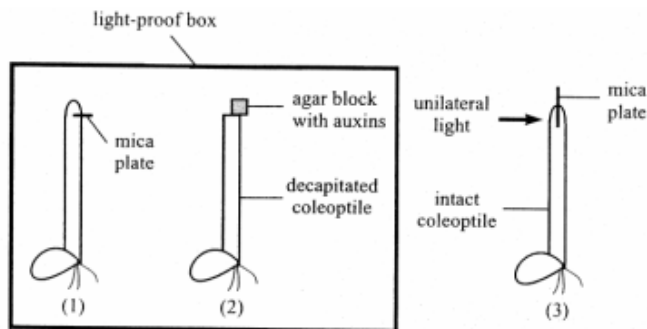


After two days, the roots was found to bend upwards. Which of the following is responsible for this change?

- A. Cells in the region of elongation grew faster
- B. The root showed negative geotropic response
- C. The effects of hydrotropism and phototropism were cancelled
- D. The upper side of the root received a higher auxin concentration than the lower side

19. 2005/II/39

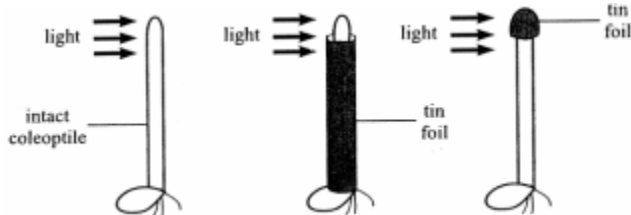
Which of the following oat coleoptiles bend toward the left hand side during growth?



- A. (1) B. (2) C. (1) and (3) D. (2) and (3)

20. 2005/II/58

The diagram below shoes the experiment used to study the growth of oat coleoptile:



What is the hypothesis being tested in this experiment?

- A. The coleoptile is positively phototropic
- B. The tip of the coleoptile is sensitive to light
- C. Auxins are produced by the tip of the coleoptile
- D. Growth occurs mainly in the region of elongation

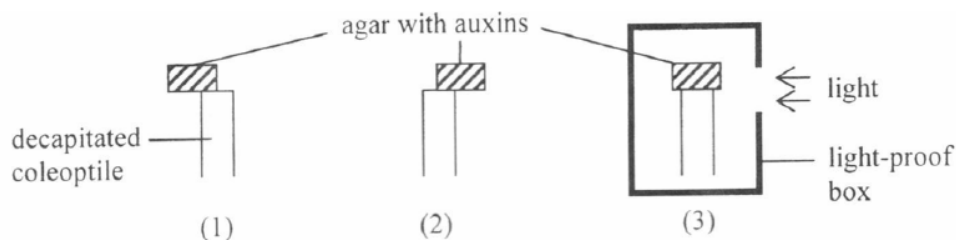
21. 2006/II/46

If a smug bean seed is germinated and grown on an agar plate with high concentration of auxins, which of the following may be observed?

- A. The shoot and root grow at the same rate
- B. Both the growth of shoot and root are promoted
- C. The growth of shoot is promoted while that of root is inhibited
- D. The growth of shoot is inhibited while that of root is promoted

22. 2006/II/47

The following diagram shows an experiment to investigate the growth response of decapitated coleoptiles:

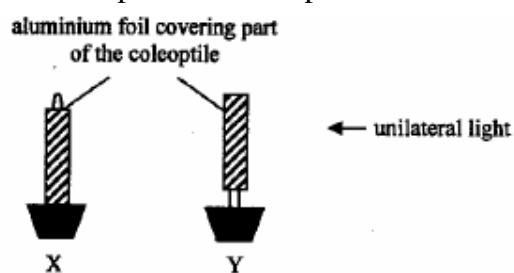


Which of the following correctly states the growth direction of the three decapitated coleoptiles?

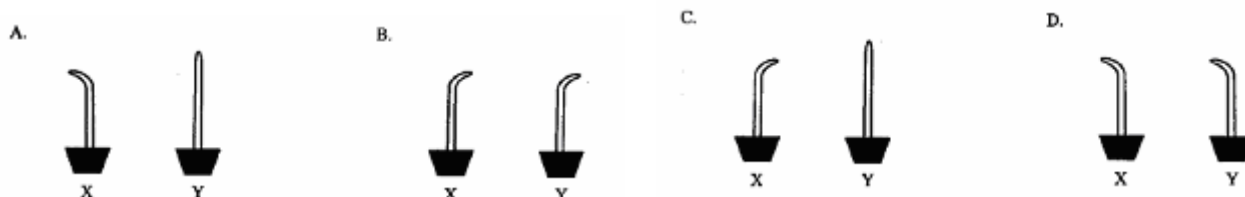
- | | (1) | (2) | (3) |
|----|-------|-------|-------|
| A. | left | right | right |
| B. | right | left | left |
| C. | left | right | left |
| D. | right | left | right |

23. 2007/II/59

Questions 23 and 24 refer to the diagram below, which shows a set-up designed by a student for investigating the growth response of coleoptiles:

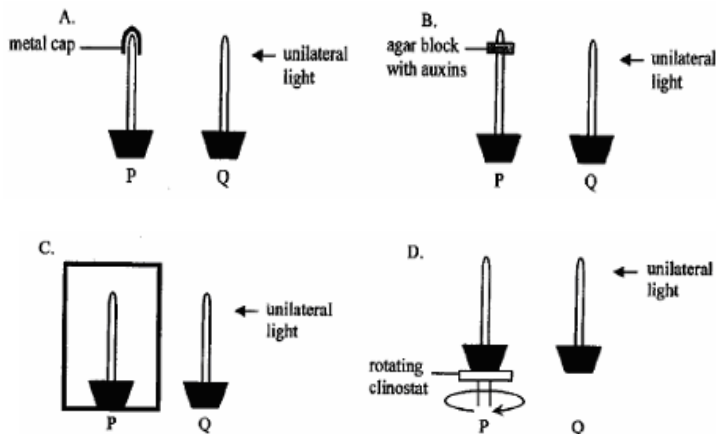


After a few days, the aluminum foil was removed. Which of the following diagrams shows the most probable results of the investigation?



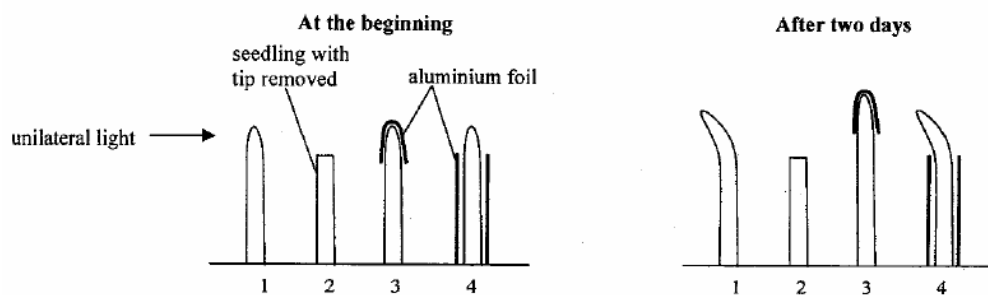
24. 2007/II/60

Which of the following set-ups would probably serve a similar aim as the student's investigation?



25. 2008/II/54

Questions 25 and 26 refer to the diagram below, which shows an investigation about the growth response of four seedlings to unilateral light:



A student concluded that the tip of the seedlings is responsible for detecting the direction of the unilateral light. His conclusion was based on the comparison of the growth of seedlings

- A. 1,2 and 3 B. 1,2 and 4 C. 1,3 and 4 D. 2,3 and 4

26. 2008/II/55

What other conclusion can be drawn from the above results?

- A. The tip of the seedlings is necessarily for growth
 B. Auxins is produced from the tip of the seedling
 C. Unilateral light causes uneven distribution of auxins
 D. This growth response ensures that plants can receive light

1. 1990/II/39

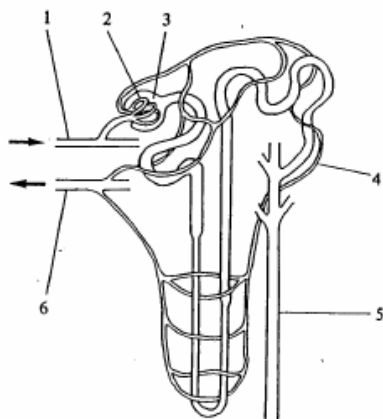
Which of the following is NOT an excretory product?

- A. urea B. faeces C. biles pigment D. carbon dioxide

2. 1991/II/59

Question 2 and 3 refer to the diagram below which shows the structure of a kidney tubule and its blood supply :

Key : → indicates direction of blood flow



Which region has the highest blood pressure?

- A. region 1 B. region 2 C. region 4 D. region 6

3. 1991/II/60

In a healthy person, which of the following substances are found in region 1 but not in region 5?

- (1) urea
(2) glucose
(3) proteins
(4) mineral salts

- A. (1) and (2) B. (1) and (4) C. (2) and (3) D. (3) and (4)

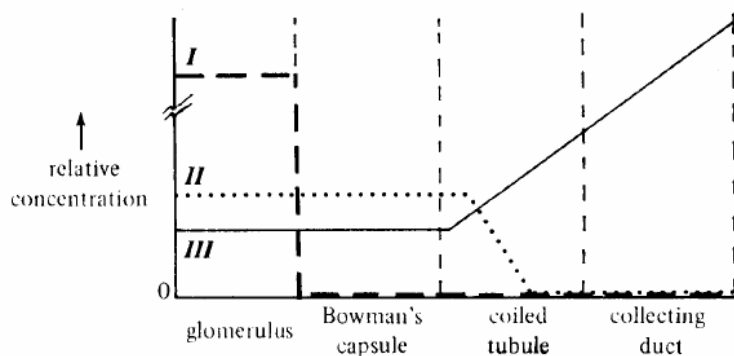
4. 1992/II/45

Urea is formed in

- A. the liver B. the bladder C. the kidneys D. the sweat glands

5. 1993/II/33

The graph below shows the relative concentration of glucose, protein and urea in the fluids obtained from various parts of the mammalian kidney:



Which of the following correctly matches the three curves?

- | | I | II | III |
|----|----------|-----------|------------|
| A. | proteins | urea | glucose |
| B. | glucose | urea | proteins |
| C. | proteins | glucose | urea |
| D. | glucose | proteins | urea |

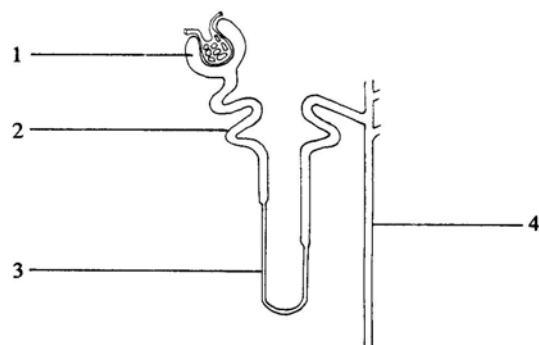
6. 1993/II/34

Which of the following is not an excretory organ of the human body?

- A. the lung B. the rectum C. the liver D. the kidney

7. 1994/II/18

Questions 7 and 8 refer to the diagram below which shows the nephron of a mammalian kidney:



Most water in the glomerular filtrate is reabsorbed in

- A. region 1 B. region 2 C. region 3 D. region 4

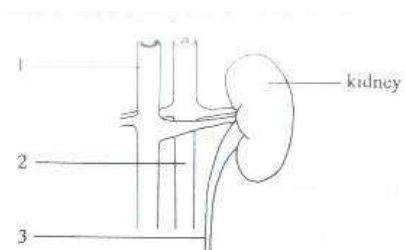
8. 1994/II/19

Which of the following correctly describes the processes occurring in different regions of the nephron?

Region 1	Region 2	Region 4
A. filtration	active transport	osmosis
B. active transport	osmosis	filtration
C. osmosis	active transport	filtration
D. filtration	osmosis	active transport

9. 1995/II/34

The diagram below shows a kidney and some associated structures :



The fluids in structures 1, 2 and 3 contain urea at different concentration. Arrange them in descending order of urea concentration.

- A. 1, 2, 3 B. 2, 3, 1 C. 3, 1, 2 D. 3, 2, 1

10. 1996/II/15

Which of the following is an excretory process?

- A. exhalation B. removal of undigested wastes C. release of saliva D. vomiting

11. 1998/II/41

Which of the following correctly describes the importance of urine production and sweating?

Urine production	Sweating
A. to remove metabolic wastes	to promote heat loss
B. to remove metabolic wastes	to maintain the water potential of body fluid
C. to maintain blood sugar concentration	to promote heat loss
D. to maintain blood sugar concentration	to maintain the water potential of body fluid

12. 1999/II/35

The metabolic wastes excreted by a mammal include

- (1) carbon dioxide
(2) lactic acid
(3) undigested food

- A. (1) only B. (1) and (2) only C. (2) and (3) only D. (1), (2) and (3)

13. 1999/II/37

The salt concentration of the urine of a person was found to decrease shortly after he drank a glass of distilled water. Which of the following is a probable reason for this?

- A. Less salt is excreted in the urine. B. More water is excreted in the urine.
C. The water potential of the blood decreases. D. Less salt is absorbed from the intestine into the blood.

14. 1999/II/38

Compared to the blood in the renal artery, the glomerular filtrate in the Bowman's capsule has

- A. a lower glucose concentration B. a higher urea concentration
C. the same oxygen content D. less protein

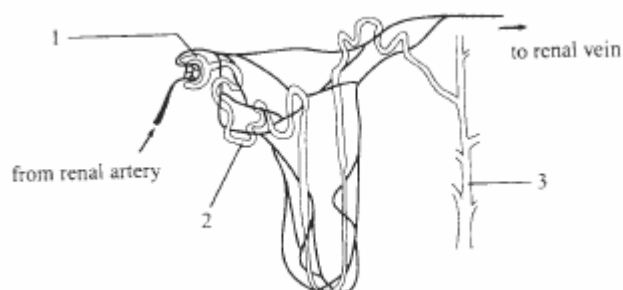
15. 1999/II/39

Which of the following descriptions of the air sacs of the lungs and the coiled tubules of the nephrons is correct ?

- A. Both have a rich blood supply.
B. Both have cells covered with cilia.
C. Both are freely permeable to dissolved substances.
D. Both have cells that carry out a high rate of respiration.

16. 2003/II/37

Questions 16 to 18 refer to the diagram below, which shows the structure of a human nephron and its associated blood vessels:



At sites 1 and 2, there is a movement of glucose between the blood and the fluid in the nephron. Which of the following correctly states the processes responsible for the movement of glucose at these two sites?

- | Site 1 | Site 2 |
|---------------|------------------|
| A. filtration | active transport |
| B. diffusion | diffusion |
| C. filtration | osmosis |
| D. diffusion | active transport |

17. 2003/II/38

In a healthy person, which of the following substances can be found in the blood of the renal vein?

- (1) urea
- (2) glucose
- (3) mineral salts

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

18. 2003/II/39

Which of the following correctly states and explains the change in concentration of the fluid in site 3 of a person after a basketball match?

Change in fluid concentration	Reason
A. decrease	a smaller proportion of water is reabsorbed
B. decrease	less mineral salts are reabsorbed
C. increase	a greater proportion of water is reabsorbed
D. increase	more mineral salts are reabsorbed

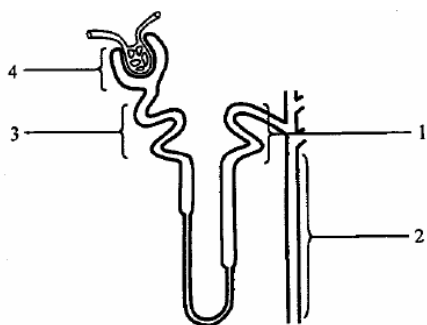
19. 2005/II/28

Which of the following processes eliminates metabolic waste from the human body?

- A. removal of trapped dust particles from the nasal cavity
- B. passing out undigested food from the gut
- C. breathing out air from the lungs
- D. loss of heat from the skin

20. 2007/II/49

Question 20 and 21 refer to the diagram below, which shows the structure of a nephron.



Which region of the nephron has cells with the greatest number of mitochondria?

- A. 1 B. 2 C. 3 D. 4

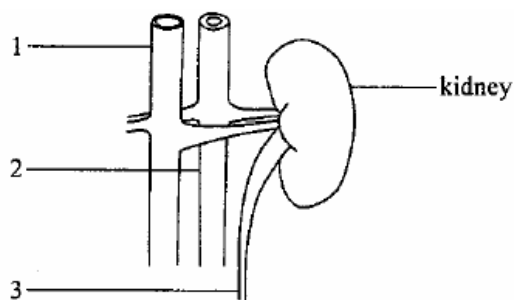
21. 2007/II/50

Which regions are responsible for the reabsorption of water?

- A. 1 and 2 B. 1 and 3 C. 2 and 3 D. 1,2 and 3

22. 2008/II/46

The diagram below shows a kidney and some associated vessels



Which of the following comparisons about the amount of the substances in the associated vessels is correct?

	Higher	Lower
A. concentration of oxygen	1	2
B. water content	1	3
C. concentration of glucose	3	1
D. concentration of urea	3	2

1. 1990/II/49

Which of the following structure of the mammalian skin is NOT involved in temperature regulation?

- A. oil glands B. nerve endings C. erector muscles D. blood capillaries

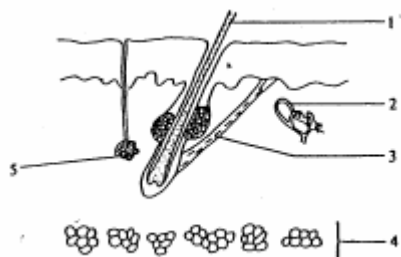
2. 1990/II/51

Under which of the following conditions would a person doing strenuous exercise lose most heat by evaporation?

	Air temperature	Relative humidity (%)
A.	10°C	60
B.	10°C	98
C.	30°C	60
D.	30°C	98

3. 1991/II/46

Questions 3 and 4 refer to the diagram below which shows a section of the human skin:



Which of the following will happen when a man feels cool?

	Constricts	Contract	Inactive
A.	1	5	3
B.	2	3	5
C.	3	2	4
D.	5	4	2

4. 1991/II/47

Which of the following are functions of structure 4?

- (1) energy reserve
(2) heat conservation
(3) body defence

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

5. 1993/II/36

In the regulation of body temperature in mammals, the skin act as

- A. a receptor B. an effector C. both a receptor and an effector D. a coordination centre

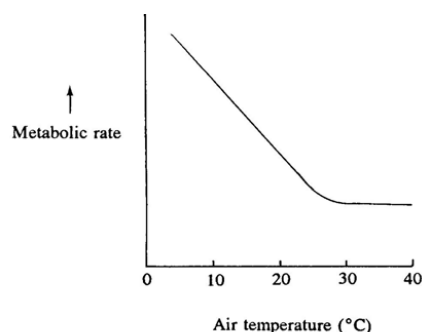
6. 1994/II/20

Which of the following correctly indicates the changes in the amount of water lost from a man when the weather becomes drier and hotter?

- | Amount of water lost from the skin | Amount of water lost from the kidneys |
|---|--|
| A. increases | remains constant |
| B. increases | decreases |
| C. decreases | increases |
| D. remains constant | decreases |

7. 1994/II/23

Questions 7 and 8 refer to the graph below which shows how the metabolic rate of a naked person varies with the temperature of the surrounding air:



Which of the following statements about the person is correct when the air temperature changes from 10°C to 20°C?

- | | |
|---------------------------------------|--|
| A. Oxygen consumption increases. | B. The rate of the heart beat increases. |
| C. Heat loss from the body decreases. | D. The body temperature decreases. |

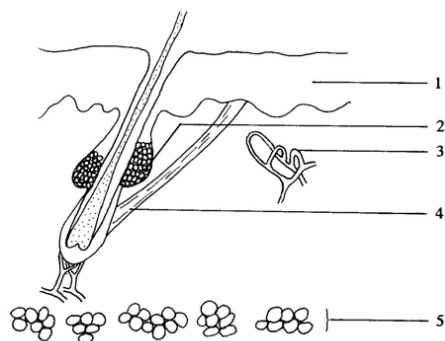
8. 1994/II/24

Which of the following is the main process of heat loss from the body when the air temperature is 40°C?

- A. conduction B. convection C. radiation D. evaporation

9. 1994/II/25

Questions 9 and 10 refer to the diagram below which shows a section of the skin of a man :



Which of the following correctly describes the functions of the different structures of the skin?

Structure 1	Structure 2	Structure 5
A. absorbs oxygen	produces sweat	absorbs vibration
B. prevents against mechanical damage	stores food	reduces heat loss
C. prevents the entry of bacteria	reduces evaporation	stores food
D. detects changes in air temperature	kills bacteria	supplies food to the skin

10. 1994/II/26

Which of the following correctly describes the immediate responses of the different structures of the skin when the man enters a cold room?

Structure 3	Structure 4	Structure 5
A. dilates	contracts	no change
B. constricts	contracts	no change
C. dilates	relaxes	becomes thicker
D. constricts	relaxes	becomes thicker

11. 1999/II/6

Questions 11 and 12 refer to the photomicrograph below, which shows a section of the mammalian skin:



Which structure produces a secretion that can reduce evaporation of water from the skin surface?

- A. 1 B. 2 C. 3 D. 4

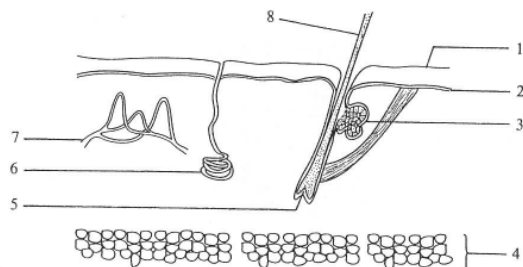
12. 1999/II/7

Which structure contains cells capable of rapid cell division ?

- A. 1 B. 2 C. 3 D. 4

13. 2002/II/52

Questions 13 to 15 refer to the diagram below, which shows a section of the human skin :



On a cold day, which of the following changes will occur to help maintain the body temperature?

- (1) Structure 4 becomes thicker.
 (2) Structure 6 becomes less active.
 (3) Structure 7 constricts.

- A. (1) only B. (2) only C. (1) and (3) only D. (2) and (3) only

14. 2002/II/53

Which structure(s) in the skin helps to prevent the entry of germs into the body?

- A. 1 only B. 1 and 3 only C. 3 and 8 only D. 1, 3 and 8

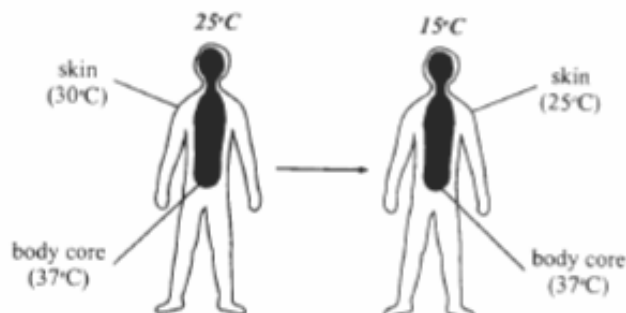
15. 2002/II/54

Which parts of the skin are capable of active cell division?

- A. 2 and 5 B. 2 and 8 C. 4 and 5 D. 4 and 8

16. 2003/II/35

Questions 16 and 17 refer to the diagram below, which shows the change in the heat distribution of a person's body when the air temperature drops from 25°C to 15°C:



Which of the following are responsible for the change in the skin temperature?

- (1) increase in heat loss
- (2) decrease in sweat secretion
- (3) constriction of the skin arterioles

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

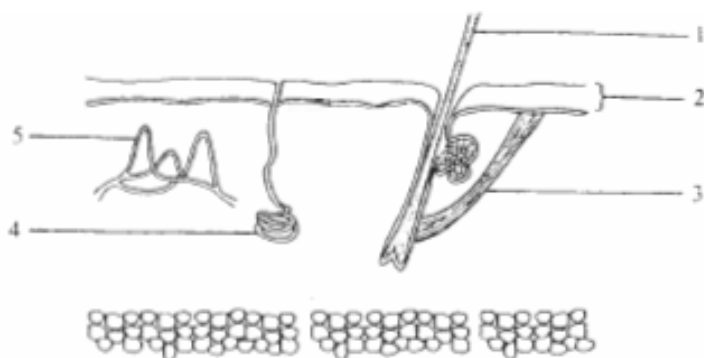
17. 2003/II/36

Which of the following will occur if the person stays at 15°C for 30 minutes without additional clothing?

- A. The metabolic rate of muscle will increase
- B. The subcutaneous fat will become thicker
- C. The urine will become more concentrated
- D. The sebaceous glands will become more active

18. 2003/II/47

Questions 18 to 20 refer to the diagram below, which shows a section of the human skin:



Which structure has the ability to contract?

- A. 1 B. 3 C. 4 D. 5

19. 2003/II/48

In a fire, structure 2 of a person was damaged by burning. Which of the following may occur at the damaged part?

- (1) excessive evaporation of water
- (2) bacterial infection
- (3) bleeding

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

20. 2003/II/49

Which of the following will occur in the skin to repair 2?

- (1) mitosis
- (2) cell specialization
- (3) increase in blood supply

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

21. 2004/II/33

Compared to the resting condition, when a person does vigorous exercise, there will be a great decrease in the amount of water lost through

A. exhalation B. sweating C. egestion C. urination

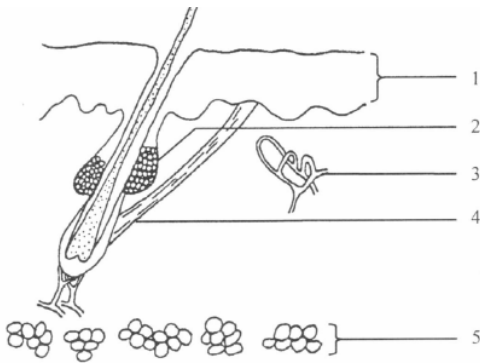
22. 2005/II/33

Which of the following is not a correct match of the structures in the skin and their functions?

Structure	Function
A. sweat gland	regulating the water potential of the body
B. sebaceous gland	preventing infection of the skin
C. blood vessel	regulating body temperature
D. sensory nerve ending	detecting external stimuli

23. 2006/II/17

Questions 23 and 24 refer to the diagram below, which shows a section of the human skin:



Which of the following correctly describes structure 1?

- A. It consists of dead cells only
- B. It reduces water loss from the body
- C. It helps the removal of metabolic wastes
- D. It has a pigment which absorbs infra-red radiation to produce vitamin D

24. 2006/II/18

Which of the above labeled structure are involved in temperature regulation in humans?

- A. 1, 3 and 4 B. 1, 4 and 5 C. 2, 3 and 5 D. 3, 4 and 5

25. 2007/II/32

Which of the following are the changes found in the skin when there is a sudden drop in environmental temperature from 25°C to 10°C?

- | Sweating | Capillaries beneath the skin |
|-----------------|-------------------------------------|
| A. decrease | less blood flow |
| B. decrease | more blood flow |
| C. increase | less blood flow |
| D. increase | more blood flow |

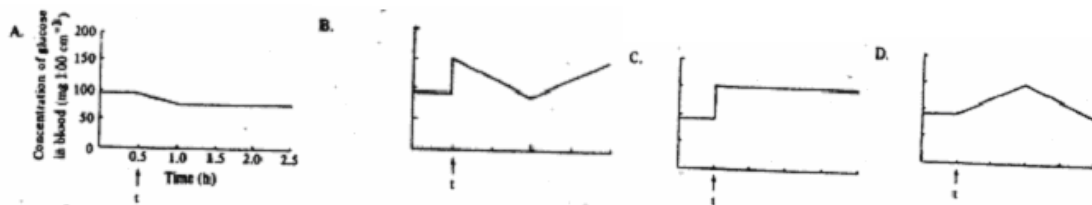
26. 2008/II/21

Which of the following structures of the human skin can help prevent the invasion of pathogen?

- (1) epidermis
 - (2) blood capillary
 - (3) sebaceous gland
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

1. 1990/II/47

A healthy person drank 100 cm^3 of 80% glucose solution at time t . Which of the following graphs shows the probable changes in his blood glucose concentration?



2. 1992/II/42

Injection of insulin into the vein of a mammal lowers its blood glucose level. This is because

- A. glucose is excreted in the urine.
- B. glucose is broken down by insulin.
- C. glucose is changed to glycogen in the liver.
- D. glucose is absorbed from small intestine.

3. 1992/II/43

Which of the following statements about insulin is true?

- A. It is an enzyme.
- B. It is carried by blood.
- C. It is secreted by the liver.
- D. It excretes its action in the pancreas.

4. 1994/II/30

Which of the following statements about insulin is incorrect?

- A. It is a protein.
- B. It is secreted by an endocrine gland.
- C. It is carried by blood to all parts of the body.
- D. It catalyses the conversion of glucose to glycogen.

5. 1995/II/37

Which of the following statements about insulin is correct?

- A. It catalyses the conversion of glucose into glycogen in the liver.
- B. A lack of insulin will result in a high blood sugar level.
- C. Blocking the pancreatic duct will stop the release of insulin from the pancreas.
- D. When the blood sugar level is high, the brain stimulates the pancreas to produce more insulin.

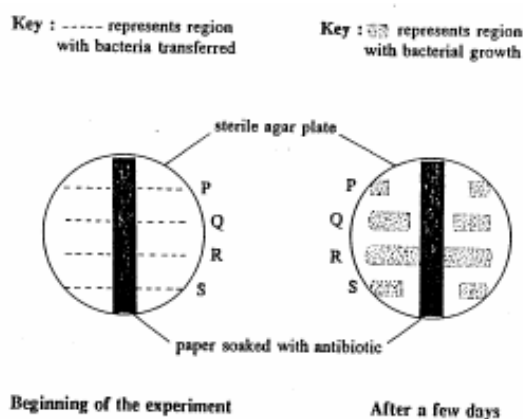
1. 1990/II/57

Penicillin is less effective in curing infections diseases today than it was thirty years ago. It is because

- A. we are now living in a more polluted environment.
- B. penicillin is now produced by a different method.
- C. our body has got used to the effect of penicillin.
- D. strains of bacteria resistant to penicillin have evolved.

2. 1991/II/56

The diagrams below show an experiment to study the effect of an antibiotic on the growth of 4 types of bacteria (P, Q, R and S):



Which type of bacteria is the least resistant to the antibiotic?

- A. P B. Q C. R D. S

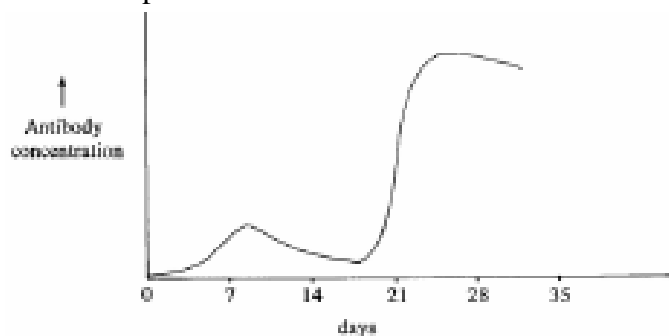
3. 1993/II/39

Which of the following are concerned with the prevention of bacterial infections in different parts of the human body?

Alimentary	Respiratory tract	Blood
A. digestive enzymes	hair	white blood cells
B. mucus	cilia	red blood cells
C. acid	mucus	blood platelets
D. bile salts	mucus	white blood cells

4. 1994/II/48

Questions 4 and 5 refer to the graph below which shows the changes in the concentration of antibodies in the blood of a person with time :



The increase in the antibody concentration on day 7 might be caused by

- A. excessive bleeding B. the entry of bacteria
C. recovery from a disease D. the intake of a large amount of antibiotics

5. 1994/II/49

The antibody concentration increased rapidly on day 21 because the person

- A. developed a fever B. received a vaccination
C. was infected by the same type of antigen D. produced a large number of phagocytes

6. 1995/II/50

Which of the following statements about antibiotics are correct?

- (1) Antibiotics are produced by microorganisms.
(2) Antibiotics inhibit the growth of microorganisms.
(3) Antibiotics combine with antigens.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

7. 1995/II/59

Penicillin, the first antibiotic discovered, is becoming less effective in controlling the spread of bacterial diseases because

- A. it is easily denatured. B. it is used less frequently today.
C. bacteria have developed resistance to it. D. the human body has become sensitive to it.

8. 1997/II/32

Which of the following components of the blood can destroy bacteria that have entered the body?

- (1) antibodies
(2) phagocytes
(3) blood platelets

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

9. 1997/II/54

Antibiotics can

- A. kill certain microorganisms. B. neutralize the effect of antigens.
C. be produced by the human body. D. inhibit the production of antibodies.

10. 1998/II/54

Which of the following statements is a correct description of antibiotics?

- A. Antibiotics are proteins. B. Antibiotics can engulf bacteria.
C. Antibiotics can be produced by fungi. D. Antibiotics can bind to specific antibodies.

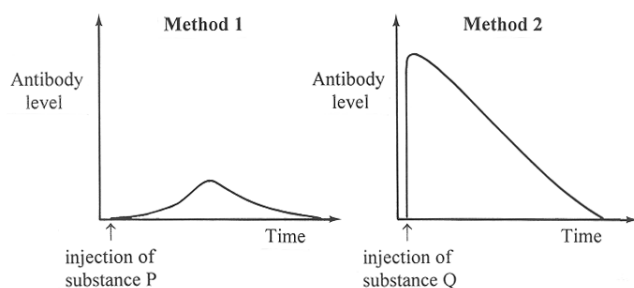
11. 1999/II/40

Which of the following statements about antibodies is incorrect?

- A. They are proteins. B. They can kill bacteria.
C. They are specific in action. D. They have a memory of the bacteria.

12. 2000/II/49

Questions 12 and 13 refer to the graphs below, which show the changes in the antibody level in the blood as a result of two methods of inducing immunity in humans :



Substance P can be

- (1) bacteria
(2) antigens
(3) antibodies
- A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

13. 2000/II/50

What is the advantage of method 2 over method 1 in inducing immunity?

- A. The immunity can last longer.
B. The immunity can develop faster.
C. It can stimulate the white blood cells to produce more antibodies.
D. The body can become immune against a wider range of diseases.

14. 2001/II/18

Which of the following statements about antibodies is correct?

- A. They act on specific antigens. B. They are produced by phagocytes.
C. They can develop a memory for antigens. D. They can replicate rapidly during infection.

15. 2001/II/60

Which of the following structures produce secretions that can protect the body from infection?

- (1) skin
(2) stomach
(3) trachea
A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

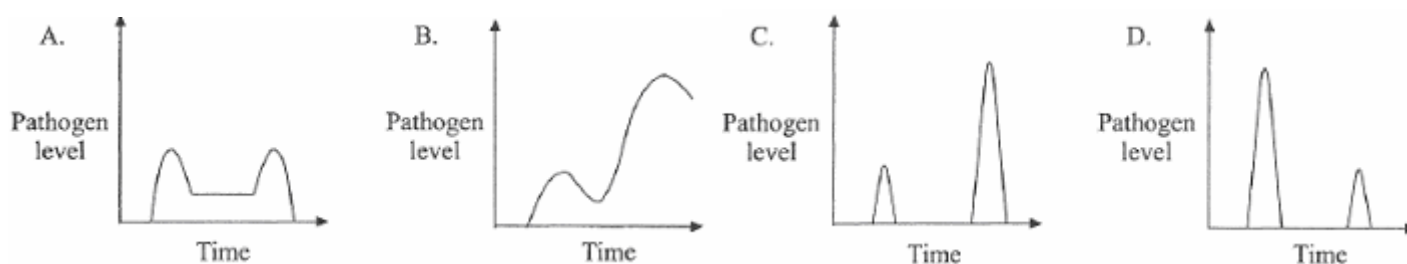
16. 2002/II/28

Which of the following statements about antibiotics is correct?

- A. They are protein in nature.
B. They act against pathogens.
C. They are produced by white blood cells.
D. One kind of antibiotics can kill a specific type of microorganisms only.

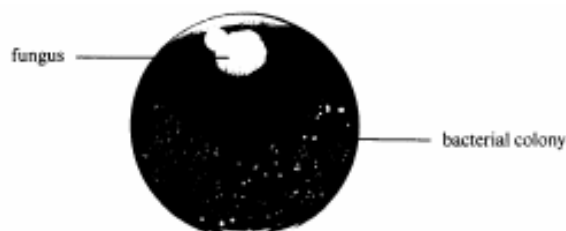
17. 2002/II/42

A person was infected by the same kind of pathogen twice within a month. Assuming the quantity of pathogen for both infections was the same, which of the following graphs correctly shows the change in the pathogen level in the person's blood ?



18. 2004/II/51

The photograph below shows a bacterial culture growing on nutrient agar. The culture is contaminated by a fungus. Which of the following correctly explains the absence of bacterial colonies around the fungus?



- A. The fungus digests the bacteria as food.
- B. The fungus competes with bacteria for the nutrients.
- C. The fungus needs more space to grow than the bacteria.
- D. The fungus produces a substance that inhibits the growth of the bacteria.

19. 2004/II/56

Which of the following about antibodies is correct?

- A. Injection of antibodies can provide immunity against certain infectious diseases.
- B. Antibodies against a particular antigen can act on a wide range of pathogens.
- C. Antibodies can develop a memory for pathogens.
- D. Antibodies can be reused.

20. 2006/II/12

Which of the following acts as a chemical barrier for preventing the entry of pathogens into the body?

- A. bile released from the gall bladder.
- B. saliva secreted from the salivary glands.
- C. blood clot formed on the wounds of the skin.
- D. mucus secreted from the epithelial cells of the trachea.

21. 2006/II/53

When there is a cut on the skin, the area around the wound will become red and swollen. The wounded area

- A. gets red because the capillaries under the skin undergo vasodilation.
- B. swells because phagocytes produce antibodies.
- C. swells because tissue fluid accumulates.
- D. gets red because the body temperature increase.

22. 2006/II/55

The misuse of antibiotics will lead to the development of bacteria with greater resistance to antibiotics. This means that

- A. most bacteria are killed and only the more resistant bacteria survive.
- B. bacteria will become stronger after applying the antibiotics.
- C. bacteria mutate in order to resist the antibiotics.
- D. bacteria get used to the antibiotics applied.

23. 2007/II/56

Questions 23 and 24 refer to the table below, which shows the result of a blood test of three individuals. None of them have received any vaccinations related to hepatitis A before.

	Level of hepatitis A antigen in blood (arbitrary unit)	Level of antibody against A antigen in blood (arbitrary unit)
X	0	0
Y	0	297
Z	300	351

Which individuals have contracted hepatitis A?

- A. X and Y
- B. X and Z
- C. Y and Z
- D. X, Y and Z

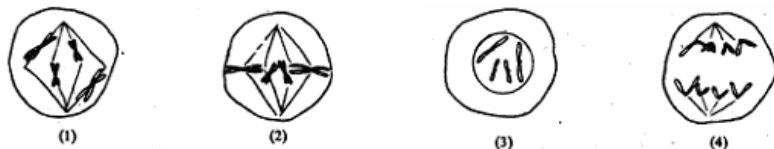
24. 2007/II/57

Vaccination can confer protective effect to individual(s)

- A. X
- B. Z
- C. X and Y
- D. Y and Z

1. 1990/II/2

The following diagrams show four different stages during a cell division:

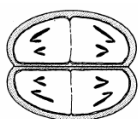


The correct sequence of the stages is

- A. (1),(2),(3),(4) B. (2),(4),(1),(3) C. (3),(1),(2),(4) D. (4),(2),(1),(3)

2. 1991/II/7

The diagram below shows a single cell undergoing cell division:



This type of cell division can be found

- A. in the anther B. in the testis C. at the root tip D. in the bone marrow

3. 1991/II/8

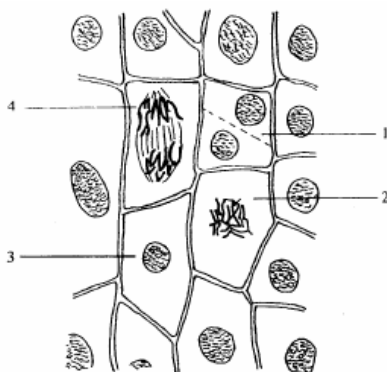
Which of the following statements concerning cell divisions are correct?

- (1) Two daughter cells are formed in mitosis
 (2) Chromosomes replicate once in mitosis and twice in meiosis
 (3) The daughter cells formed in meiosis have the same number of chromosomes

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

4. 1993/II/3

Questions 4 and 5 refer to the diagram below which shows cells at the root tip in various stages of cell division:



Which of the following is a correct sequence of the different stages of the cell division?

- A. 1 → 2 → 3 → 4 B. 1 → 3 → 4 → 2 C. 3 → 2 → 4 → 1 D. 3 → 4 → 2 → 1

5. 1993/II/4

This type of cell division occurs during the formation of

- (1) skin cells
- (2) sperm cells
- (3) red blood cells

A. (1) only B. (2) only C. (1) and (3) only D. (2) and (3) only

6. 1995/II/4

Below are three different stages of a cell division:

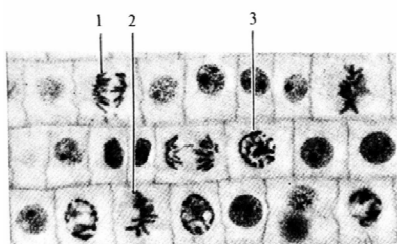
- (1) Chromosomes separate
- (2) Chromosomes arrange themselves at the equator of the spindle
- (3) Chromosomes duplicate

Arrange them in order.

A. (1)→(2)→(3) B. (1)→(3)→(2) C. (2)→(1)→(3) D. (3)→(2)→(1)

7. 1996/II/9

The photomicrograph below shows some plant cells at different stages of mitosis:



Which cells contain the same amount of DNA?

A. 1 and 2 only B. 1 and 3 only C. 2 and 3 only D. 1, 2 and 3

8. 1996/II/46

In which of the following does meiosis occur?

- (1) the ovaries
- (2) the uterus
- (3) the placenta

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

9. 1997/II/7

The diagram below shows a certain stage of cell division:



Which of the following is correct?

	Type of cell division	Number of chromosomes in each daughter cell
A.	mitosis	2 pairs
B.	mitosis	4 pairs
C.	meiosis	2 pairs
D.	meiosis	4 pairs

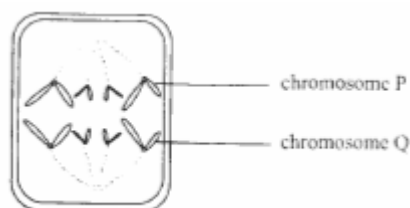
10. 1998/II/44

Which of the following comparisons between mitosis and meiosis is correct?

Mitosis	Meiosis
A. chromosomes duplicate once	chromosomes duplicate twice
B. homologous chromosomes do not pair up	homologous chromosomes pair up
C. sister chromatids separate	sister chromatids never separate
D. haploid cells formed	diploid cells formed

11. 2003/II/11

The diagram below shows a dividing cell found at the root tip of a plant:

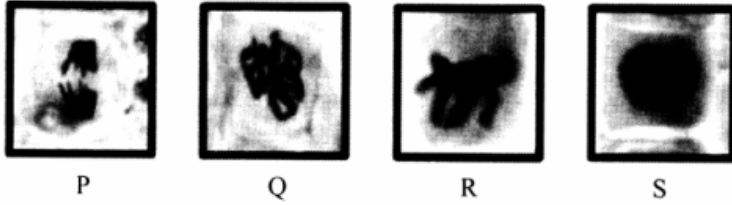


Which of the following is correct?

- | | |
|--|--|
| A. The parent cell has eight chromosomes | B. P and Q are homologous chromosomes |
| C. The daughter cells will be haploid | D. Each daughter cell will have four chromosomes |

12. 2003/II/57

The photomicrographs below show four stages in the cell division of plant cells :



The correct sequence of the four stages is

- A. $Q \rightarrow S \rightarrow R \rightarrow P$ B. $R \rightarrow P \rightarrow Q \rightarrow S$
C. $S \rightarrow Q \rightarrow R \rightarrow P$ D. $S \rightarrow R \rightarrow P \rightarrow Q$

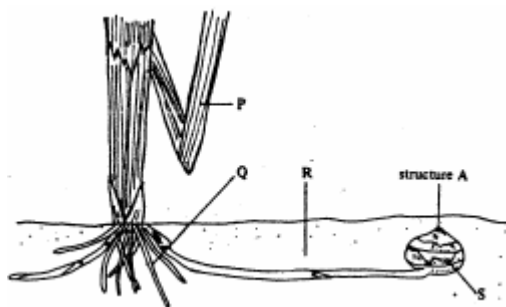
1. 1990/II/22

Which of the following statements about binary fission in amoeba is INCORRECT?

- A. Two daughter amoebae are formed in each fission
- B. Two daughter amoebae are identical in their genetic contents
- C. The chromosomes number of daughter amoebae is half of that of the parent
- D. The newly-formed daughter amoebae are smaller in size than their parent

2. 1990/II/43

Questions 2 and 3 refer to the diagram below which shows the underground structures of a flowering plant:



The daughter plant developed from structure A

- (1) possess the same genotype as the parent plant
 - (2) has the same chromosomes number as the parent plant
 - (3) can carry out sexual reproduction
- A. (1) only B. (3) only C. (1) and (2) only D. (1),(2) and (3)

3. 1990/II/44

Which of the following provides the major source of food for the development of the daughter plant from structure A?

- A. P B. Q C. R D. S

4. 1992/II/20

Questions 4 and 5 refer to the following plant produce:

- (1) peanuts
- (2) potatoes
- (3) rice grains
- (4) soya beans

Which of the following statements is true?

- A. They have low starch content
- B. They can be used for propagation
- C. They contain in a large amount of fat
- D. They are products of non-flowering plants

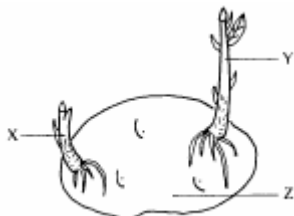
5. 1992/II/21

Which types of plant produce is best for supplementing the diet of people in poor countries so as to reduce protein deficiency?

- A. (1) B. (2) C. (3) D. (4)

6. 1993/II/42

The diagram below shows a sprouting potato tuber:

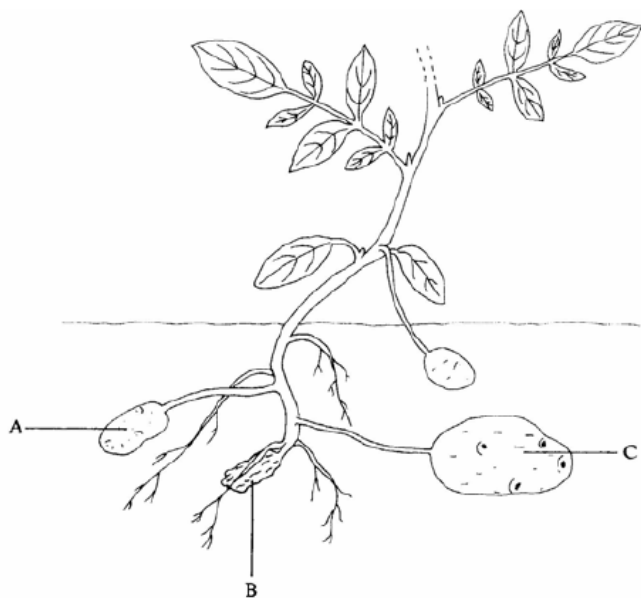


Which of the following statements is incorrect?

- A. The genotype of X and Y are the same
 B. X and Y will develop into independent plants
 C. X and Y are developed from the buds of the potato tuber
 D. Food produced by X and Y will be stored in region Z

7. 1994/II/42

The diagram below shows a potato plant:



Which of the following statements is correct?

- A. Cells of structures A, B and C have the same genotype.
 B. Structures A, B and C are produced by the same parent plant.
 C. Structure B provides nutrients for the growth of structures A and C.
 D. Structures A and C are modified roots for food storage.

8. 1995/II/45

Which of the following is an advantage of vegetative propagation in flowering plants?

- A. The daughter plants will develop more rapidly.
- B. The daughter plants will show more genetic variation.
- C. The daughter plants will not get diseases from the parent.
- D. The daughter plants will be better adapted to a changing environment.

9. 1998/II/40

Which of the following organisms can produce offspring from a single parent?

- (1) bread mould
- (2) African violet
- (3) yeast

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

10. 2000/II/51

Potato plants can be reproduced by seeds or by stem tubers. Stem tubers are organs for vegetative propagation.

Which of the following comparisons between these two methods of reproduction is correct?

		Seed	Stem tuber
A	Genetic variation in offspring	Less	More
B	Chromosome number of the cells of offspring	Haploid	Diploid
C	Chance of dispersal of offspring	Smaller	Greater
D	Chance of passing infectious diseases to offspring	Smaller	greater

11. 2002/II/24

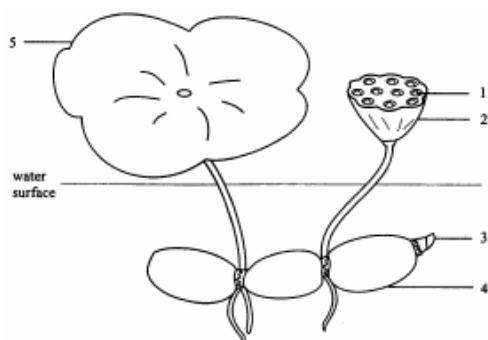
Just before undergoing binary fission, an amoeba will

- (1) store a lot of water
- (2) duplicate the chromosomes
- (3) double the amount of cytoplasm

- A. (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

12. 2004/II/41

Questions 12 and 13 refer to the following diagram of a lotus plant:



Among the following structures, which has a different genotype?

- A. 1 B. 2 C. 3 D. 4

13. 2004/II/42

Which part of this plant produces food for the development of 3?

- A. 1 B. 2 C. 4 D. 5

14. 2005/II/37

Questions 14 and 15 refer to the following photographs of four different plant structures:



Structure 1



Structure 2



Structure 3



Structure 4

Which of these structure is not an organ for vegetative propagation?

- A. 1 B. 2 C. 3 D. 4

15. 2005/II/38

All the four structure have

- (1) buds
- (2) seeds
- (3) stored food

- A. (2) only B. (3) only C. (1) and (2) only D. (1) and (3) only

16. 2005/II/49

Flowering plants may reproduce by forming stem tubers, bulbs or corms. These ways of reproduction are said to be asexual because

- A. no fertilization takes place
- B. only one parent is involved
- C. they occur under favourable conditions
- D. they produce offspring that are similar to the parents

17. 2008/II/43

Which of the following are reasons why bacteria can evolve rapidly in response to environmental changes?

- (1) They mutate more readily
- (2) They have a short life cycle
- (3) In each reproduction, they produce a large number of offspring

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

18. 2008/II/50

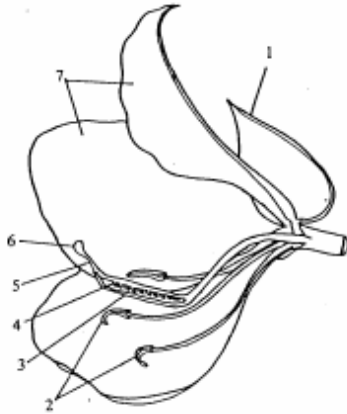
Which of the following are the advantages of asexual reproduction?

- (1) The offspring colonize a new habitat rapidly
- (2) The offspring preserve the good traits from their parents
- (3) The offspring are adapted to their parents' natural environment

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

1. 1991/II/31

Questions 1 to 3 refer to the diagram below which shows the section of a flower:



Structures 1 and 5 are

Structure 1	Structure 5
A. sepal	style
B. petal	stigma
C. sepal	stigma
D. petal	style

2. 1991/II/32

Which of the following characteristics shown in the diagram indicate that the flower is insect-pollinated?

- (1) Structure 2 and 6 are enclosed with structure 7
- (2) Structure 4 occurs in small numbers
- (3) Structure 7 is large and conspicuous

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

3. 1991/II/33

Which structures will usually wither after fertilization?

- A. 1, 2, 3 and 5 B. 1, 3, 6 and 7 C. 2, 5, 6 and 7 D. 3, 5, 6 and 7

4. 1992/II/36

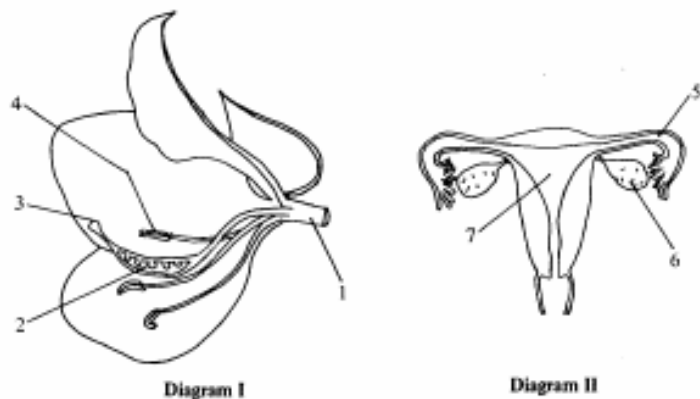
Which of the following are advantages of seed dispersal?

- (1) It reduces competition
- (2) It prevents the spread of diseases
- (3) It increases the chances of genetic variations

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

5. 1992/II/37

Questions 5 and 6 refer to the diagrams below. Diagram I shows a longitudinal section of a flower. Diagram II shows a section of the human female reproductive system.



Where does fertilization normally occur?

	Diagram I	Diagram II
A.	3	5
B.	2	5
C.	3	7
D.	2	7

6. 1992/II/38

Which structure of the flower is comparable to structure 6 in human?

- A. 1 B. 2 C. 3 D. 4

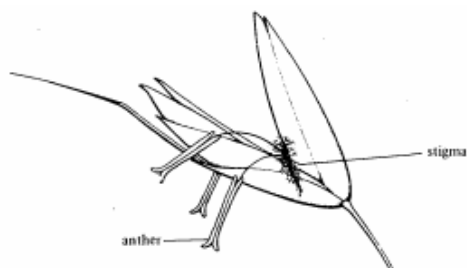
7. 1992/II/39

If the diploid chromosomes number of a flowering plant is 24, which of the following structures has 12 chromosomes?

- A. an anther B. an embryo C. a stigma D. a pollen grain

8. 1993/II/45

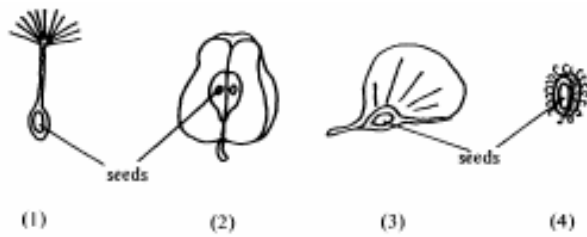
With reference to the above diagram, which of the following characteristics indicates that this flower is adapted to wind pollination?



- A. It is bisexual flower B. Its stigma hangs outside the flower
C. Its anthers lie below the stigma D. Its anthers produce numerous pollen grains

9. 1993/II/46

The diagram below shows sections of four different fruits:



Which of the above fruits carry seed that are dispread by animals?

- A. (1) and (2) only B. (1) and (3) only C. (2) and (4) only D. (3) and (4) only

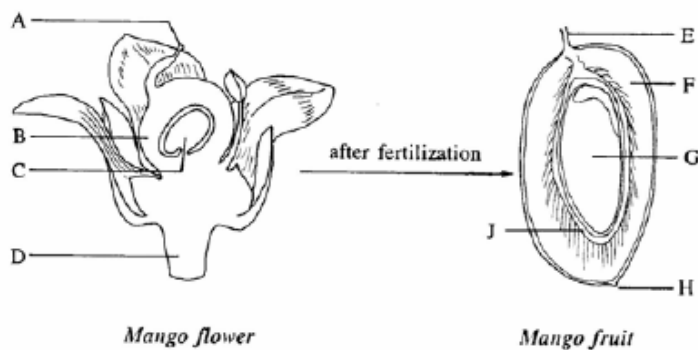
10. 1994/II/43

Pollen grains are usually produced in large numbers so that

- A. the species can explore new environments. B. competition among the new plants can be reduced.
C. they can help the dispersal of new plants. D. they can have a greater chance of reaching other flowers

11. 1994/II/44

Questions 11 and 12 refer to the diagrams below which show the flower and the fruit of a mango plant:



Which of the following statements is correct?

- A. E is developed from D. B. F is developed from C.
C. G is developed from B. D. H is developed from A.

12. 1994/II/45

Which of the following features helps the dispersal of G?

- A. F is fleshy and juicy. B. G can be carried by the wind.
C. H can stick to the fur of mammals. D. J is hairy.

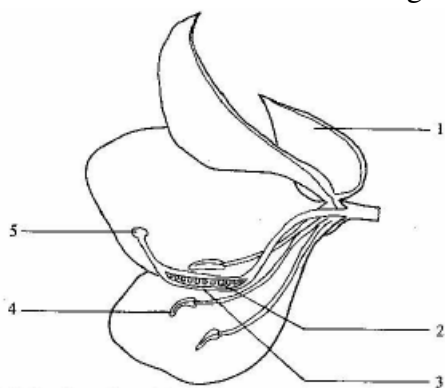
13. 1995/II/42

Which of the following is an example of reproduction involving fertilization?

- A. binary fission in amoeba B. product of spores in bread mould
C. formation of stem tubers in potato D. formation of seeds in maize

14. 1995/II/46

Question 14 and 15 refer to the diagram below which shows the longitudinal section of a flower :



Haploid cells are formed in

- A. 2 and 3 B. 2 and 4 C. 3 and 5 D. 4 and 5

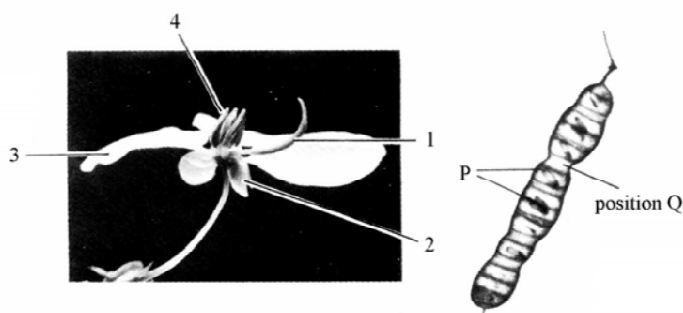
15. 1995/II/47

Which structure is responsible for receiving the pollen grains?

- A. 1 B. 2 C. 4 D. 5

16. 1996/II/47

Questions 16 to 18 refer to the photographs below which show a flower and a fruit of a local plant:



Which parts of the flower produce gametes?

- A. 1 and 3 B. 1 and 4 C. 2 and 3 D. 2 and 4

17. 1996/II/48

The fruit develops from part

- A. 1. B. 2. C. 3. D. 4.

18. 1996/II/49

Structure P is not found at position Q. Which of the following are the possible reasons for this?

- (1) There was no ovule at position Q.
- (2) The ovule at position Q was not fertilized.
- (3) The pollen grains did not reach position Q.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

19. 1997/II/39

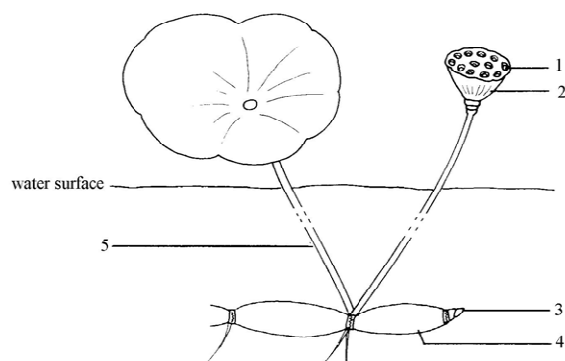
Which of the following are the advantages of seed dispersal?

- (1) to reduce competition within a species
- (2) to allow the species to explore new environments
- (3) to enable the species to become more adaptable to a changing environment

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

20. 1997/II/42

Questions 20 and 21 refer to the diagram below which shows part of a lotus plant:



Both structures 1 and 3 can give rise to new plants. Which of the following comparisons between the two ways of reproduction is incorrect?

	<i>Reproduction by structure 1</i>	<i>Reproduction by structure 3</i>
A.	results in genetic variations	no genetic variation
B.	relies on external agent	does not need external agent
C.	both can prevent overcrowding of offspring	
D.	both can enable the plant to survive adverse conditions	

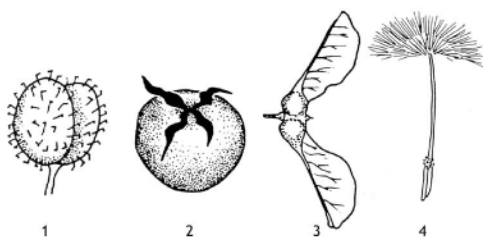
21. 1997/II/43

Which structures store food for the development of new plants?

A. 1 and 4 B. 1 and 5 C. 2 and 4 D. 2 and 5

22. 1998/II/42

The diagram below shows four types of fruits :

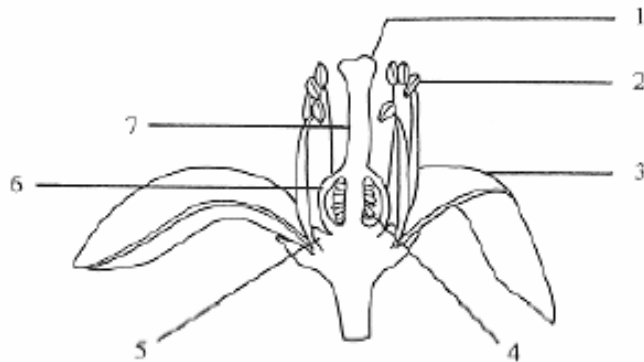


Which fruits above carry seeds that are dispersed by animals?

A. 1 and 2 B. 2 and 3 C. 3 and 4 D. 4 and 1

23. 1999/II/41

Questions 23 to 25 refer to the diagram below, which shows the longitudinal section of a flower :



Meiosis occurs in

- A. 1 and 4. B. 1 and 6. C. 2 and 4. D. 2 and 6.

24. 1999/II/42

Fertilization may take place in

- A. 1. B. 4. C. 6. D. 7.

25. 1999/II/43

Which structures would be reduced or absent in a wind-pollinated flower?

- A. 1 and 2 B. 1 and 3 C. 2 and 5 D. 3 and 5

26. 2002/II/20

Which of the following comparisons between the reproductive methods of yeast and Bauhinia is incorrect?

Budding of yeast**Seed formation in Bauhinia**

- | | |
|---|--|
| A. involves only one sex | involves two sexes |
| B. meiosis not involved | meiosis involved |
| C. involves one type of gametes | involves two types of gametes |
| D. offspring genetically identical to parents | offspring genetically different from parents |

27. 2002/II/55

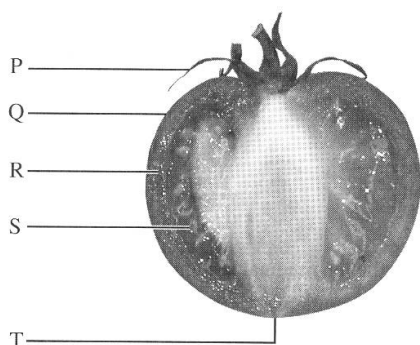
Some pollen grains of a mango tree are transferred to the stigma of another mango tree. Which of the following statements about the pollen grains of the mango tree is/are correct ?

- (1) They are the male gametes.
 (2) They help in the dispersal of mango plants.
 (3) They help to transfer genetic materials from one mango tree to another.

- A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

28. 2002/II/57

Questions 28 and 29 refer to the diagram below, which shows a section of a tomato :



Which part(s) of the tomato helps in the dispersal of S?

- A. P only B. R only C. P and Q only D. P, Q and R

29. 2002/II/58

T is a scar on the surface of the tomato. Which of the following gives rise to T?

- A. detachment of the flower stalk B. detachment of the petals
C. detachment of the stamens D. detachment of the style

30. 2003/II/54

Cross pollination is the transfer of pollens from one plant to another plant of the same species. It may be beneficial to the plant species because it leads to

- A. greater genetic variation B. wider dispersal of the species
C. the production of more seeds D. the elimination of alleles for undesirable character

31. 2003/II/58

Questions 31 and 32 refer to the diagram below, which shows the human female reproductive system and the carpel of a flower:



Which of the followings pairs of structures and their roles in reproduction are correctly matched?

- | Structures | Role |
|------------|---|
| A. 1 and 8 | the site of fertilization |
| B. 2 and 7 | the site of gamete production |
| C. 3 and 7 | for supplying food and oxygen to the embryo |
| D. 4 and 5 | for protecting the male gametes |

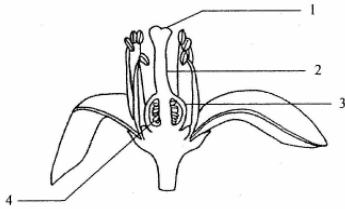
32. 2003/II/59

Which of the following parts will increase greatly in size after fertilization?

- A. 1 and 8 B. 2 and 5 C. 3 and 7 D. 4 and 6

33. 2005/II/55

Questions 33 and 34 refer to the diagram below, which shows a longitudinal section of a flower:



Fertilization occurs in structure

- A. 1 B. 2 C. 3 D. 4

34. 2005/II/56

The flower produces numerous pollen grains. What is the importance of this?

- A. to attract insects B. to disperse the offspring
C. to increase the chances of fertilization D. to increase the variation of the species

35. 2006/II/57

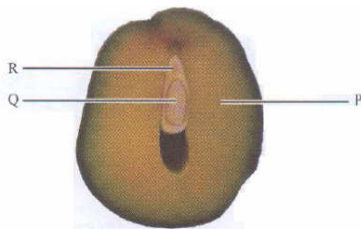
Which of the following process concerning reproduction in flowering plants will lead to variation in offspring?

- (1) formation of gametes
(2) fusion of gametes from the same plant
(3) fusion of gametes from two plants of the same species

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

36. 2008/II/56

Question 36 and 37 refer to the diagram below, which shows the cross section of a mango:



Which part(s) contain stored food for germination?

- A. P B. Q C. P and R D. Q and R

37. 2008/II/57

Which parts have the same genotype in their cells?

- A. P and Q B. P and R C. Q and R D. P,Q and R

1. 1990/II/52

Which of the following is/are true for sexual reproduction?

- (1) It always involves two different parents
- (2) The resulting offspring are genetically different
- (3) The resulting offspring always healthy

A. (1) only B. (2) only C. (1) and (2) only D. (2) and (3) only

2. 1991/II/34

The following events are involved in the process of giving birth to a baby:

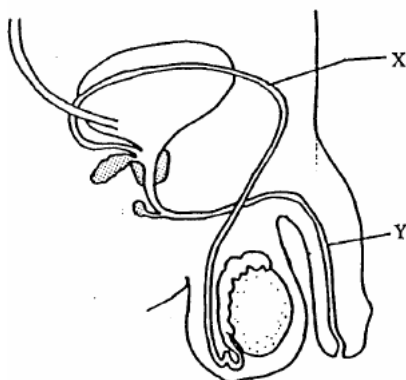
- (1) The placenta is detached and expelled from the uterus
- (2) The umbilical cord is tied and cut
- (3) The cervix dilates
- (4) The baby is pushed out
- (5) The uterus contracts rhythmically causing the amniotic membrane to rupture

Which of the following is the correct order?

A. (1),(3),(4),(5),(2) B. (1),(5),(3),(4),(2) C. (3),(4),(5),(2),(1) D. (5),(3),(4),(2),(1)

3. 1991/II/35

Questions 3 and 4 refer to the diagram below which shows part of the male urinogenital system of man:



Structure X and Y are:

Structure X	Structure Y
A. sperm duct	urethra
B. urethra	sperm duct
C. ureter	sperm duct
D. sperm duct	ureter

4. 1991/II/36

If duct X is blocked, which of the following is true?

- A. no urination
- B. no sperm in the semen
- C. no sperm production
- D. no sex hormone production

5. 1992/II/40

One of the functions of the placenta of a mammal is to

- A. expel the foetus during childbirth
- B. protect the foetus from mechanical injury
- C. allow the mother's blood to flow into the capillary network of the foetus
- D. allow metabolic wastes to pass from the foetal circulation to that of the mother

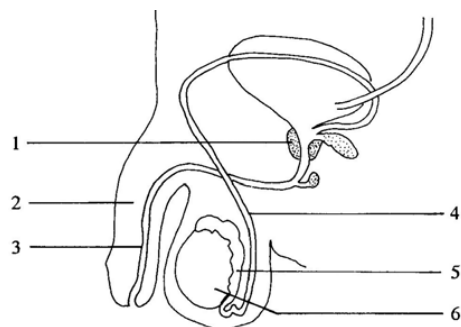
6. 1993/II/44

Which of the following is a male secondary sexual characteristic in humans?

- A. production of sperms
- B. development of the testis
- C. widening off the hip girdle
- D. development of stronger muscles

7. 1994/II/40

The diagram below shows part of the male urinogenital system of man:



	Structure for the production of seminal fluid	Structure for transmitting urine	Structure for the production of gametes
A.	1	3	5
B.	2	4	5
C.	1	3	6
D.	2	4	6

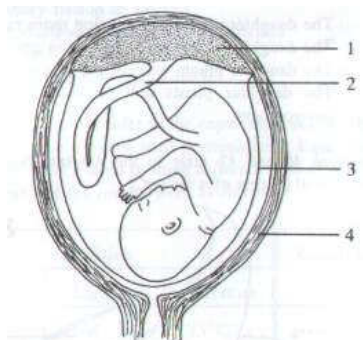
8. 1994/II/41

Which of the following statements about birth control methods is correct?

- A. A condom can prevent the entry of sperms into the uterus.
- B. Cutting the sperm ducts can stop the production of sperms.
- C. Contraceptive pills can prevent the implantation of the embryo.
- D. The 'natural rhythm' method involves avoiding copulation after menstruation.

9. 1995/II/48

Question 9 and 10 refer to the diagram below which shows a foetus in the mother's body :



When the baby is born, which structures will be expelled from the mother's body?

- A. 1 and 2 only B. 3 and 4 only C. 1, 2 and 3 only D. 2, 3 and 4 only

10. 1995/II/49

Which structures are responsible for removing waste from the foetus?

- A. 1 and 2 B. 1 and 3 C. 2 and 4 D. 3 and 4

11. 1996/II/39

If both oviducts of a woman are tied up and cut, which of the following is correct?

	<u>Ovulation</u>	<u>Menstruation</u>
A.	✓	✓
B.	x	x
C.	✓	x
D.	x	✓

Key: ✓ = occurs
 x = does not occur

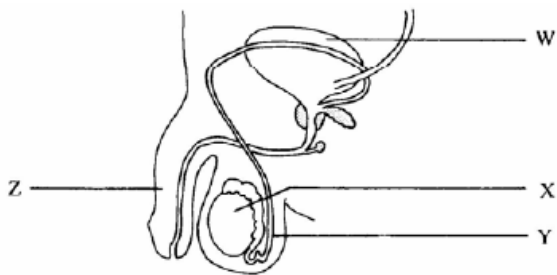
12. 1996/II/40

Which of the following birth control methods is the least reliable?

- A. using condoms B. the rhythm method
 C. using contraceptive pills D. tying up the sperm ducts

13. 1996/II/41

Questions 13 and 14 refer to the diagram below which shows part of the urinogenital system of a man:



Which of the following correctly shows the function of structures W, X and Y?

- | W | X | Y |
|-------------------|-------------------|------------------|
| A. produces urine | produces sperms | transfers urine |
| B. produces urine | produces hormones | transfers sperms |
| C. stores urine | produces sperms | transfers urine |
| D. stores urine | produces hormones | transfers sperms |

14. 1996/II/42

Which structure increases significantly in size during sexual intercourse?

- A. W B. X C. Y D. Z

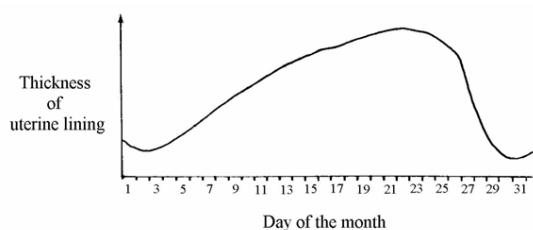
15. 1996/II/43

Which of the following cannot pass from the maternal blood to the foetal blood through the placenta?

- A. antibodies B. oxygen C. red blood cells D. sugars

16. 1996/II/44

Questions 16 and 17 refer to the diagram below which shows the changes in the thickness of the uterine lining of a woman in a certain month:



Menstruation is likely to have occurred during

- A. the 3rd - 7th day. B. the 10th - 14th day.
C. the 20th - 24th day. D. the 26th - 30th day.

17. 1996/II/45

Pregnancy might have resulted if sexual intercourse took place during

- A. the 3rd - 7th day. B. the 10th - 14th day.
C. the 20th - 24th day. D. the 26th - 30th day.

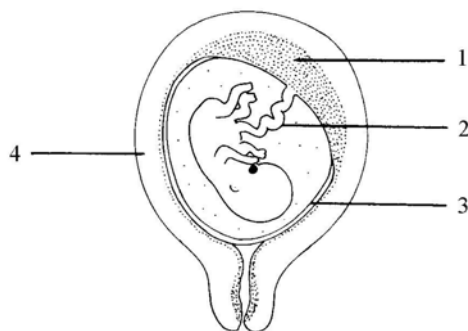
18. 1997/II/40

Which of the following combinations is incorrect?

Human structure	Function
A. ovary	to produce eggs
B. testis	to produce hormones
C. seminal vesicle	to store sperms
D. mammary gland	to produce milk

19. 1997/II/44

Questions 19 and 20 refer to the diagram below which shows a foetus in the mother's body:



Which of the following are the functions of structures 1, 2 and 3?

Structure 1	Structure 2	Structure 3
A. food supply	gaseous exchange	protection
B. protection	food supply	gaseous exchange
C. food transport	protection	gaseous exchange
D. gaseous exchange	food transport	protection

20. 1997/II/45

Which structures have the same genotype in their cells?

- A. 2 and 3 only B. 2 and 4 only C. 3 and 4 only D. 2, 3 and 4

21. 1997/II/46

Which of the following comparisons of the two birth control methods used by women is correct?

Contraceptive pills	Tying up of oviducts
A. ovulation occurs	no ovulation
B. no implantation of embryo	implantation of embryo occurs
C. no menstruation	menstruation occurs
D. easy to cancel its contraceptive effect	hard to cancel its contraceptive effect

22. 1997/II/47

Arrange the following events of the birth process in the correct sequence.

- (1) expulsion of placenta
- (2) breaking of amnion
- (3) dilation of cervix
- (4) expulsion of foetus
- (5) cutting of umbilical cord
- (6) onset of labour

- A. (3), (2), (6), (4), (1), (5) B. (3), (6), (4), (2), (1), (5)
 C. (6), (2), (4), (3), (5), (1) D. (6), (3), (2), (4), (5), (1)

23. 1997/II/58

Human being usually bears one baby at a time because normally

- A. only one uterus is found in the female.
 B. only one egg is released in each ovulation.
 C. only one sperm can successfully fertilize an egg.
 D. only one embryo is allowed to implant on the uterine wall.

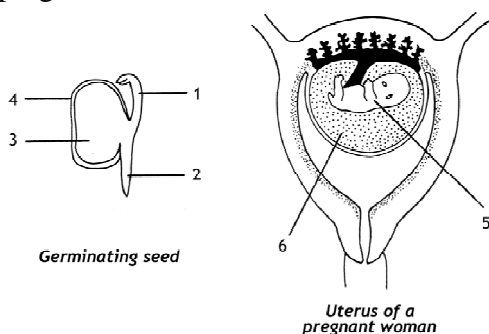
24. 1997/II/59

Both the human ovum and sperm

- A. can undergo meiosis. B. may contain the X chromosome.
 C. may contain the Y chromosome. D. have the same amount of cytoplasm.

25. 1998/II/35

Questions 25 and 26 refer to the diagrams below which show a section of a germinating seed and the uterus of a pregnant woman :



Which structures of the germinating seed are comparable to structure 5?

- A. 1 and 2 B. 2 and 3 C. 3 and 4 D. 4 and 1

26. 1998/II/36

Which of the following correctly states the function of structure 3 and fluid 6 at the stage of development shown above ?

Structure 3	Fluid 6
A. for protection	for gaseous exchange
B. for supplying food	for gaseous exchange
C. for protection	for protection
D. for supplying food	for protection

27. 1998/II/37

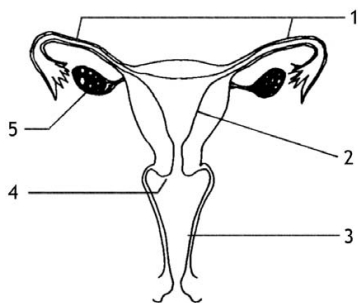
Arrange the following processes of human reproduction in the correct sequence :

- (1) copulation
- (2) fertilization
- (3) meiosis
- (4) pregnancy

- A. (2), (1), (4), (3) B. (2), (3), (1), (4) C. (3), (1), (2), (4) D. (3), (2), (1), (4)

28. 1998/II/45

Questions 28 and 29 refer to the diagram below which shows the human female reproductive system :



Which of the following combinations of birth control methods and their site of action is correct ?

Birth control method	Site of action
A. female condom	2
B. contraceptive pills	3
C. diaphragm	4
D. sperm-killing chemicals	5

29. 1998/II/46

If both structures labeled 1 are tied up and cut, which of the following will not occur?

- (1) fertilization
- (2) menstruation
- (3) formation of ova

- A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

30. 2000/II/37

Questions 30 to 32 refer to the passage below :

Test tube babies

Some couples are unable to have children. This problem may now be solved by the technique of *in vitro* fertilization (IVF).

Before undergoing the IVF, a woman is given hormones to stimulate a large number of eggs to develop and mature simultaneously in her ovaries. Several eggs are then collected by suctioning through a hollow needle. They are transferred to a petri dish with a nutrient solution and a sample of semen. The fertilized eggs are allowed to develop for two to three days, by which time they have reached the eight- or sixteen-cell stage. Several of these embryos are then placed into the woman's uterus.

Which of the following are the possible causes of infertility in married couples?

- (1) The sperm count is low.
- (2) The oviducts are blocked.
- (3) The duration of the menstrual cycle is not constant.

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

31. 2000/II/38

In IVF, fertilization occurs in

A. the oviduct B. the uterus C. the needle D. the petri dish

32. 2000/II/39

The doctor has to wait for two to three days before transferring the embryos into the woman's uterus. This is to

- A. allow time for fertilization to occur.
- B. allow the embryos to obtain sufficient nutrients.
- C. make sure that the uterus is ready for the implantation of the embryos.
- D. ensure that the embryos to be placed into the uterus are developing normally.

33. 2000/II/54

Which of the following are the functions of the amniotic fluid in humans?

- (1) It acts as a shock absorber.
- (2) It provides nutrients to the embryo.
- (3) It protects the embryo from desiccation.

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

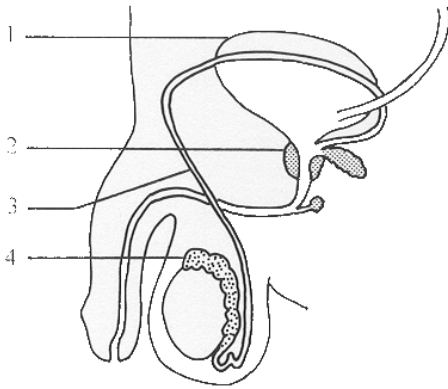
34. 2001/II/21

A fertilized ovum differs from an ovum in that it

- A. has two cells. B. is double in size. C. divides by meiosis. D. contains more DNA.

35. 2001/II/33

Questions 35 and 36 refer to the diagram below, which shows part of the urinogenital system of a man :



Which of the following structures contribute to the content of semen?

- A. 1 and 3 B. 1 and 4 C. 2 and 3 D. 2 and 4

36. 2001/II/34

Which of the following may still occur after structure 3 on both sides of the body are tied up and cut ?

- (1) production of sperms
(2) production of seminal fluid
(3) production of male sex hormone

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

37. 2001/II/35

Which of the following can pass from the maternal blood to the foetal blood through the placenta?

- (1) antibody (2) nicotine (3) red blood cell

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

38. 2001/II/36

The foetus in the uterus obtains oxygen through

- (1) its lungs.
(2) the amnion.
(3) the placenta.

- A. (1) only B. (3) only C. (1) and (3) only D. (2) and (3) only

39. 2001/II/37

What is the function of contraceptive pills?

- A. to prevent ovulation
- B. to increase the thickness of the uterine lining
- C. to stimulate the development of the mammary glands
- D. to maintain a high level of sex hormones in the blood

40. 2001/II/40

Which of the following may affect the body mass of newborn babies?

- (1) genetic make-up of the father
 - (2) smoking habit of the mother
 - (3) diet of the mother
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

41. 2002/II/18

Which of the following is a similarity between a human sperm and a male gamete of a flowering plant?

- A. Both are motile.
- B. Both have a tail.
- C. Both are haploid.
- D. Both determine the sex of the offspring.

42. 2002/II/25

Normally, a woman discharges bloody fluid from her uterus for several weeks after giving birth. Which of the following is the reason for this?

- A. The remaining amniotic fluid is released from the uterus.
- B. The blood of the woman cannot clot properly.
- C. Menstruation re-starts after giving birth.
- D. The thickened uterine lining is shed.

43. 2003/II/42

A pair of identical twins are developed from

- A. an egg which has fused with sperm
- B. An egg which has fused with two sperms
- C. two eggs which have fused with a sperm
- D. two eggs which have fused with two sperms

44. 2003/II/44

Questions 44 and 45 refer to the diagram below, which shows part of the urinogenital system of a man:



The following statements describe the function of structures P and R at different stage of a man's life. Which one is correct?

- A. At age 4, structures P start to secrete seminal fluid
- B. At puberty, structures P start to secrete male sex hormones
- C. From puberty to age 50, structure R releases sperms once a month
- D. After age 50, structure R still produces sperms

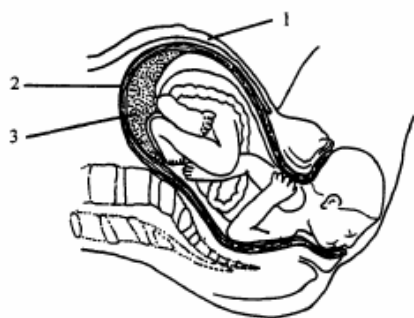
45. 2003/II/45

Which of the following will occur after structure Q has been tied and cut?

- A. The breasts will enlarge
- B. Structure R will shrink in size
- C. Pubic hair will become thinner
- D. The semen will contain no sperms

46. 2004/II/47

Questions 46 and 47 refer to the diagram below, which shows a foetus in the mother's body:



Which of the following help(s) to expel the foetus from the mother's body during birth?

- A. 1
- B. 2
- C. 1 and 2
- D. 1, 2 and 3

47. 2004/II/48

Which of the following cannot pass through 3 from the mother's blood to the foetus?

- A. alcohol
- B. antibodies
- C. haemoglobin
- D. urea

48. 2004/II/55

P and Q in the diagram below are the reproductive structures of a mammal and a flowering plant respectively.



Which of the following comparisons between P and Q is correct?

- A. Both P and Q are male gametes
- B. Both structures 1 and 4 carry the Y chromosome
- C. Both structure 1 and 4 contain the same number of chromosomes
- D. Both structures 2 and 3 enable the male gamete to meet the female gamete

49. 2005/II/25

Twins with identical genotypes are produced when

- A. two sperms fuse with an egg
- B. two eggs are produced from the ovary at the same time
- C. two eggs are fertilized by two sperms
- D. two embryos are developed from a fertilized egg

50. 2005/II/27

A human egg is much smaller than a chicken's egg. This is because

- A. the human egg is fertilized inside the mother's body
- B. the human egg has to develop in the uterus after fertilization
- C. the human egg supplies food only for the early stage of embryo
- D. the human embryo takes a much longer time to develop into a baby

51. 2005/II/34

The following is a calendar of the month of May:

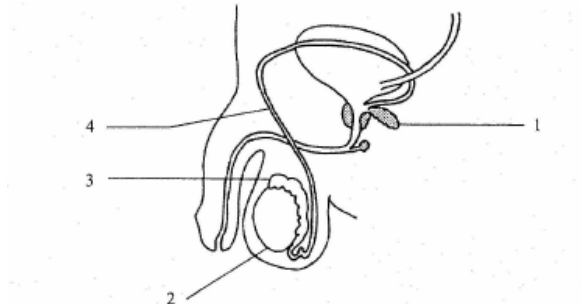
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

A woman predicts that her next menstrual flow will start on 25th May. She would have a higher chance of becoming pregnant if she has sexual intercourse between

- A. 1st and 7th May
- B. 8th and 14th May
- C. 15th and 21st May
- D. 28th and 31st May

52. 2005/II/35

Questions 52 and 53 refer to the diagram below, which shows part of the urinogenital system of a man:



Which structure is responsible for the storage of mature sperms?

- A. 1 B. 2 C. 3 D. 4

53. 2005/II/36

If structure 4 were tied and cut, which of the following would occur?

- A. The semen would not contain any sperms.
 B. The tests would stop producing any sperms.
 C. The voice of the man would become high-pitched.
 D. The man would fail to ejaculate during sexual intercourse.

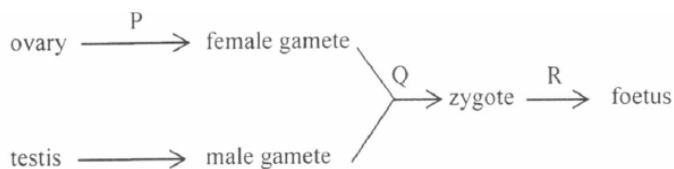
54. 2005/II/57

Which of the following are advantages of breast-feeding?

- (1) Mother's milk contains the right amount of protein and fat
 (2) Mother's milk contains enzymes to help digesting the food (*This option is true in fact !*)
 (3) Mother's milk contains antibodies that provide immunity to the baby
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

55. 2006/II/29

The following flowchart shows the main processes involved in the human reproduction:

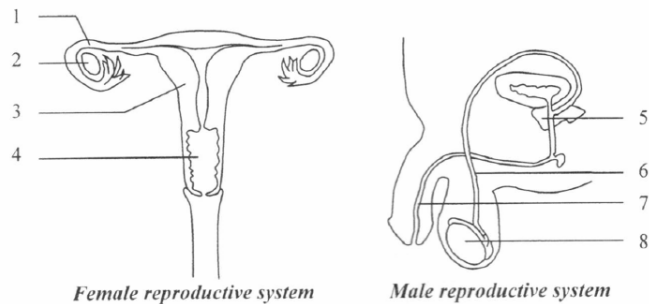


The contraceptive methods used at P, Q and R for birth control could be

- | P | Q | R |
|-------------------------|---------------------|----------------------|
| A. contraceptive pills | condom | intra-uterine device |
| B. intra-uterine device | contraceptive pills | spermicide |
| C. contraceptive pills | spermicide | condom |
| D. spermicide | condom | intra-uterine device |

56. 2006/II/30

Questions 56 and 57 refer to the diagrams of the human reproductive system below.



Which of the following structures serve similar functions?

- A. 1 and 6 B. 2 and 5 C. 3 and 7 D. 4 and 8

57. 2006/II/31

Which of the following will be affected if 3 is removed?

- (1) fertility
(2) ovulation
(3) implantation

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

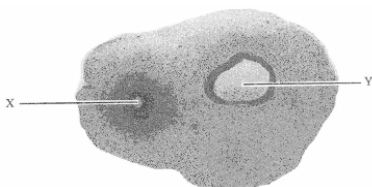
58. 2006/II/32

Which of the following descriptions about tubal ligation and vasectomy (i.e. tying and cutting of oviducts and sperm ducts respectively) is correct?

- A. Sperms are still produced after vasectomy
B. Pregnancy is impossible after vasectomy
C. There is no menstruation after tubal ligation
D. The secondary sexual characteristics will be affected after tubal ligation

59. 2006/II/48

The following photograph shows the cross section of a structure connecting the foetus to the mother:



Which of the following comparisons between the content of X and Y is correct?

X**Y**

- | | |
|------------------------|---------------------|
| A. less urea | more urea |
| B. less protein | more protein |
| C. more oxygen | less oxygen |
| D. more carbon dioxide | less carbon dioxide |

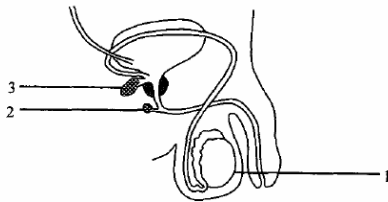
60. 2006/II/60

Which of the following correctly describes pollen grains and sperms?

- A. They are motile
- B. They are haploid
- C. They are male gametes
- D. They both carry the Y chromosomes

61. 2007/II/15

The diagram below shows part of the urinogenital system of a man:



Which of the following structures contribute to the content of semen?

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2 and 3

62. 2007/II/16

Which of the following is a female secondary sexual characteristic?

- A. the growth of pubic hair
- B. growing taller
- C. menstruation
- D. acne on face

63. 2007/II/17

Which of the following cannot help the sperm to get into the uterus during sexual intercourse?

- A. contraction of the uterus
- B. contraction of the sperm duct
- C. beating action of the sperm tail
- D. beating action of the cilia on the oviduct

64. 2007/II/18

Which of the flowing substances will diffuse from maternal blood to foetal blood through the placenta?

- A. urea
- B. oxygen
- C. carbon dioxide
- D. blood platelets

65. 2007/II/52

A couple, who have already had three children, decided not to have babies in the future. Which of the following contraceptive measures is most reliable?

- A. restricting sexual intercourse to safe periods
- B. tying and cutting the oviducts
- C. using a diaphragm
- D. using a condom

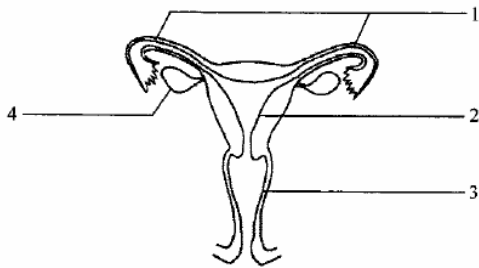
66. 2007/II/53

Amitotic fluid cannot provide protection to foetus against

- A. desiccation
- B. mechanical injury
- C. chemical poisoning
- D. sudden change in temperature

67. 2008/II/22

Questions 67 and 68 refer to the diagram below, which shows a female reproductive system:



For a successful pregnancy, fertilization usually takes place at

- A. 1 B. 2 C. 3 D. 4

68. 2008/II/23

Which parts will start to have periodic change once a girl reaches puberty?

- A. 1 and 3 B. 1 and 4 C. 2 and 3 D. 2 and 4

69. 2008/II/24

After the release of sperms into the vagina, only a very small portion of sperms can reach the site of fertilization.

Which of the following is not an explanation for this?

- A. Some sperms are trapped by the mucus in the vagina
 B. Some sperms are killed by the acidity of the vagina
 C. Some sperms are defective and immotile
 D. Some sperms swim faster than the others

70. 2008/II/25

Below are some events that take place after fertilization. Arrange them in the correct order.

- (1) development into a ball of cells
 (2) formation of placenta
 (3) implantation
 (4) development into a foetus

- A. (1),(3),(2),(4) B. (1),(4),(3),(2) C. (3),(1),(4),(2) D. (3),(2),(1),(4)

71. 2008/II/26

The placenta allows the passage of

- A. platelets from the mother's blood to the foetal blood
 B. enzymes from the mother's blood to the foetal blood
 C. antibodies from the mother's blood to the foetal blood
 D. haemoglobin from the mother's blood to the foetal blood

72. 2008/II/27

Which of the following pairs of contraceptive methods are based on the same biological principle?

- A. the use of condom and diaphragm
- B. the use of condom and intra-uterine device
- C. the use of diaphragm and contraceptive device
- D. the use of contraceptive pills and intra-uterine device

1. 1992/II/41

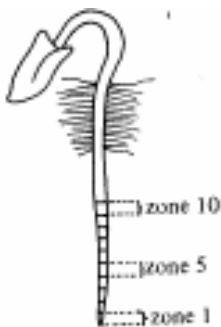
The conditions necessary for germination for all kinds of seeds are

- (1) light
- (2) water
- (3) oxygen
- (4) a suitable temperature

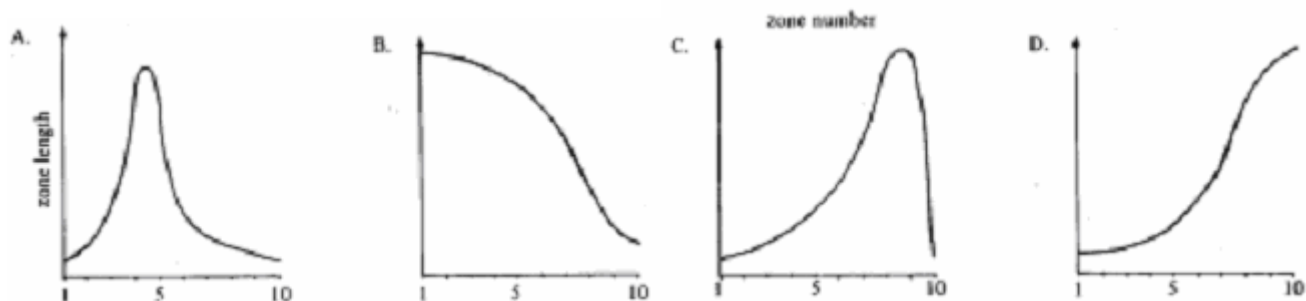
A. (1) and (2) only B. (1),(3) and (4) only C. (2),(3) and (4) only D. (1),(2),(3),(4)

2. 1992/II/60

The root tip of a young seedling was marked with Indian ink at equal intervals of 2mm from the tip as shown below:

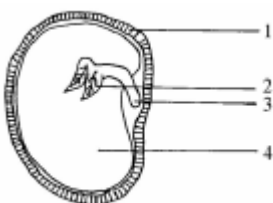


After two days, the length of each zone was measured, and a graph was plotted. Which of the following graphs best represents the growth pattern of the root tip?



3. 1994/II/46

Questions 3 and 4 refer to the diagram below which shows a longitudinal section of a broad bean seed.



Which of the following occurs when the seed germinates?

- A. Structure 1 carries out photosynthesis.
- B. Structure 2 is the first part that grows out through structure 1.
- C. Structure 3 shows positive geotropism.
- D. Structure 4 undergoes rapid growth.

4. 1994/II/47

When the broad bean seed germinates, which of the following is incorrect?

- A. the dry mass increases B. the fresh mass increases
C. the length of the stem increases D. the length of the root increases

5. 1995/II/43

Question 5 and 6 refer to the experiment below which attempted to study the conditions for seed germination. Equal numbers of broad bean seeds were placed in three different pots soil. The conditions of the pots and the results were as follows :

Pot	Condition			Results after one week
	Water supply	Light	temperature	
1	✓	✓	25°C	Germination occurred
2	×	✓	5°C	No germination
3	×	✓	25°C	No germination

Key : ✓ indicates the presence of the factor concerned

× indicates the absence of the factor concerned

Based on the above results, germination of broad bean seeds requires

- A. water B. warmth C. water and warmth D. water, light and warmth

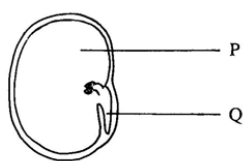
6. 1995/II/44

In pot 1, some seeds failed to germinate. What is the most probable reason for this ?

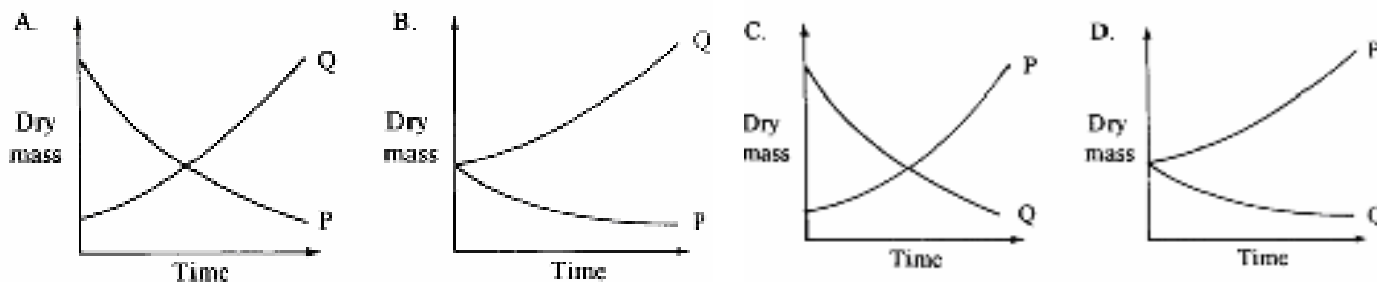
- A. There seeds were dead. B. There seeds could not carry out photosynthesis.
C. There was not enough light. D. The temperature was too high.

7. 1996/II/50

The diagram below shows the longitudinal section of a bean seed:

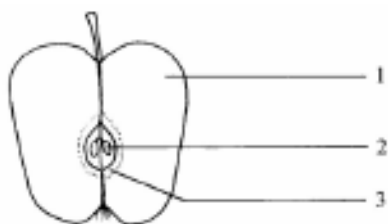


Which of the following graphs correctly shows the changes in dry mass of structures P and Q during germination?



8. 1996/II/51

The diagram below shows the vertical section of an apple:



Which of the following structures contain(s) stored food for seed germination?

- A. 1 only B. 2 only C. 1 and 2 only D. 1, 2 and 3

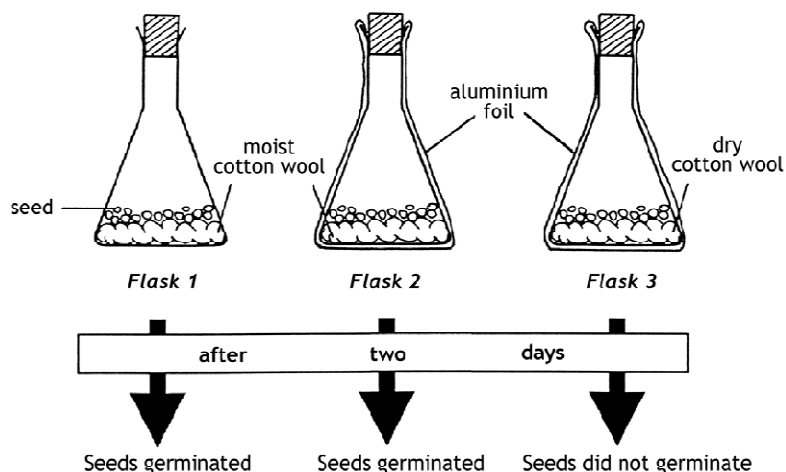
9. 1997/II/60

Which of the following cannot be used to measure the growth of a child?

- A. body weight B. length of hair C. circumference of head D. length of middle finger

10. 1998/II/47

Questions 10 and 11 refer to the diagram below which shows three flasks set up by a student to investigate the conditions necessary for seed germination. The flasks were kept at 30°C.



What conclusion can be drawn from the results above?

- A. Light is necessary for germination. B. Water is necessary for germination.
C. 30°C is the optimum temperature for germination. D. No conclusion can be drawn.

11. 1998/II/48

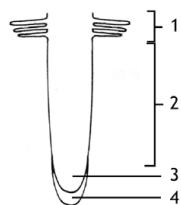
The seedling in flask 2 died after one week. Which of the following are possible reasons for this?

- (1) The stored food is used up.
(2) The seedlings cannot carry out photosynthesis.
(3) Auxins in the seedlings are destroyed in darkness.

- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

12. 1998/II/49

Questions 12 and 13 refer to the diagram below which shows the longitudinal section of a young root :



Which of the following combinations is correct?

	Region with the most types of cell	Region with cells of the smallest size
A.	1	3
B.	2	4
C.	3	2
D.	4	1

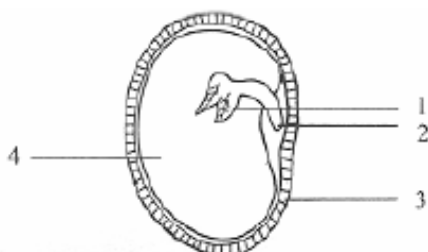
13. 1998/II/50

Which region mainly contributes to the increase in length of the root?

- A. 1 B. 2 C. 3 D. 4

14. 1999/II/44

Questions 14 and 15 refer to the diagram below, which shows a section of a broad bean :



Which parts of the broad bean are formed from the fertilized egg?

- A. 1 and 2 only B. 3 and 4 only C. 1, 2 and 4 only D. 1, 2, 3 and 4

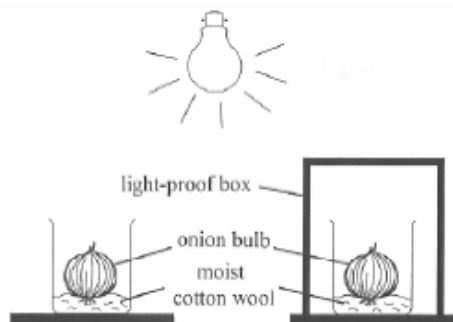
15. 1999/II/45

Which part of the broad bean would be stained blue-black by iodine solution?

- A. 1 B. 2 C. 3 D. 4

16. 1999/II/47

Questions 16 to 18 refer to the diagram below, which shows a set-up used by Eric in an experiment. After one week, he noted whether the onion bulb in each beaker had germinated into a new plant.



This experiment was designed to find out whether the development of new plants from the onion bulbs required

- A. light B. water C. light and water D. light or water

17. 1999/II/48

If the onion bulbs in both beakers germinate after one week, what conclusion can be drawn ?

- A. Light is not necessary for the germination of onion bulbs.
 B. Water is not necessary for the germination of onion bulbs.
 C. Either light or water is necessary for the germination of onion bulbs.
 D. No conclusion can be drawn.

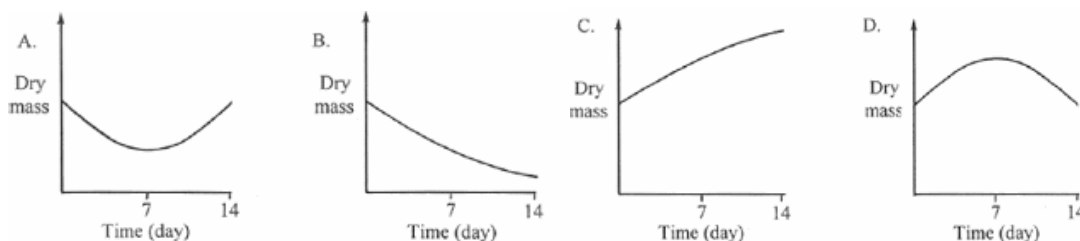
18. 1999/II/49

If the onion bulbs in both beakers do not germinate after one week, what conclusion can be drawn?

- A. Light is not necessary for the germination of onion bulbs.
 B. Water is not necessary for the germination of onion bulbs.
 C. Besides light and water, other factors are necessary for the germination of onion bulbs.
 D. No conclusion can be drawn.

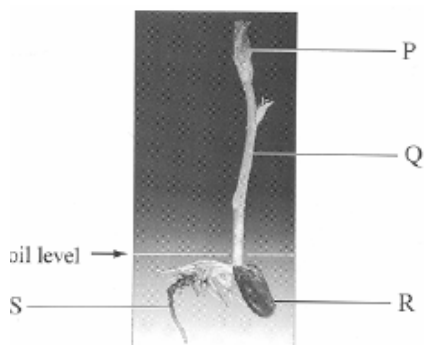
19. 2000/II/44

A student soaked some mung beans in water for two days and then put them on moist cotton wool in a petri dish. Which of the following graphs indicates the change in dry mass of the seedlings?



20. 2001/II/45

Questions 20 and 21 refer to the photograph below, which shows a 7-day-old bean seedling :

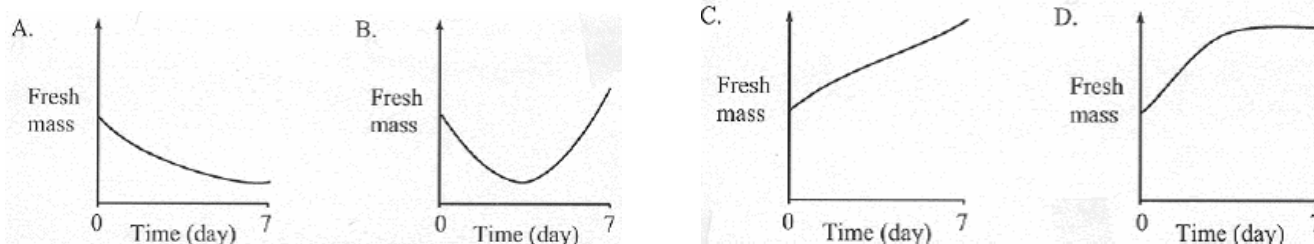


The food that supported the growth of the seedling up to this stage mainly came from

- A. the photosynthesis of P. B. the photosynthesis of Q.
C. the food stored in R. D. the absorption of nutrients from the soil by S.

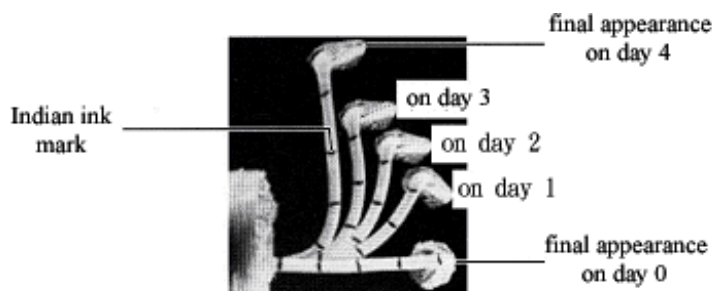
21. 2001/II/46

Which of the following graphs correctly shows the changes in the fresh mass of the seedling in the past 7 days?



22. 2002/II/50

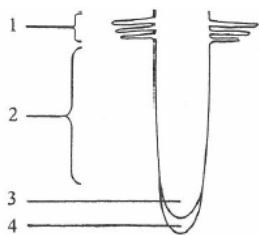
The photograph below shows the appearance of a plumule at different stages of growth under uniform light. After some time, the plumule bent upwards. Which of the following can account for the changes shown in the photograph ?



- (1) mitosis
(2) cell enlargement
(3) uneven distribution of auxins
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

23. 2002/II/56

The diagram below shows the longitudinal section of a young root :

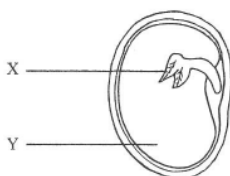


Xylem and phloem are found in region

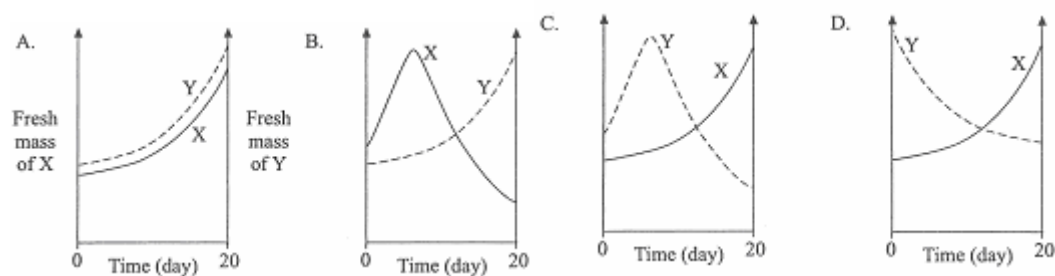
- A. 1. B. 2. C. 3. D. 4.

24. 2002/II/60

The diagram below shows a broad bean seed :



Which of the following graphs correctly shows the changes in the fresh mass of parts X and Y during germination?



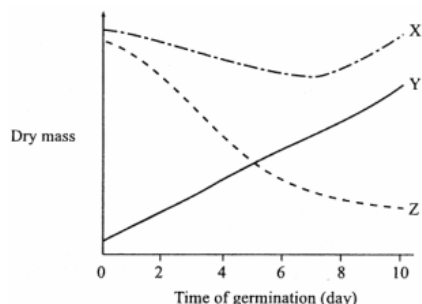
25. 2003/II/60

Which of the following is a relatively reliable parameter for measuring the growth of a person?

- A. body height B. waistline C. hair length D. intelligence quotient (IQ)

26. 2005/II/53

Questions 26 and 27 refer to the graph below, which shows the changes in dry mass of a bean seedling, the cotyledons and the plumule of the same seedling during the early stages of germination:



Which curves represent the changes in dry mass of the whole seedling and the cotyledons?

	Whole seedling	Cotyledons
A.	X	Y
B.	X	Z
C.	Y	X
D.	Y	Z

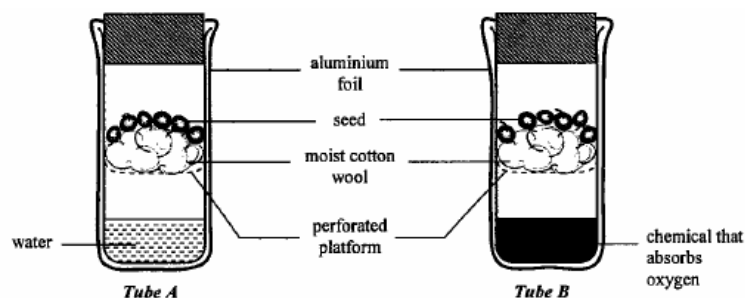
27. 2005/II/54

In which period is the photosynthetic rate of the seedling higher than its respiration rate?

- A. day 1 to day 5 B. day 1 to day 10 C. day 5 to day 10 D. day 7 to day 10

28. 2007/II/54

Questions 28 and 29 refer to the diagram below, which shows a set-up used to investigate the conditions for seed germination. The tubes were kept at 30°C. The seeds in tube A germinated while those in tube B did not

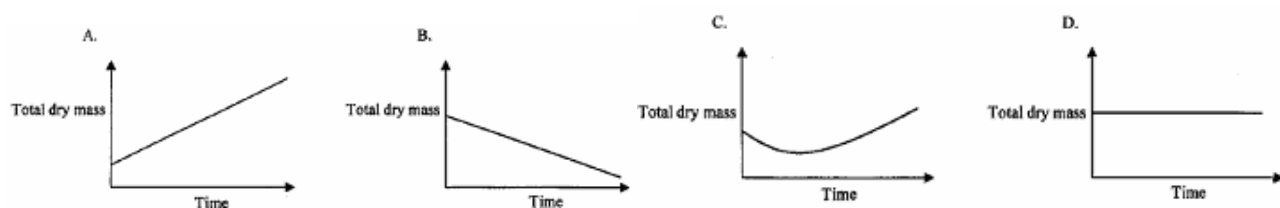


Based on the design of the set-up, the investigation is to test whether

- A. water is necessary for seed germination B. oxygen is necessarily for seed germination
C. soil is necessarily for seed germination D. light is necessary for seed germination

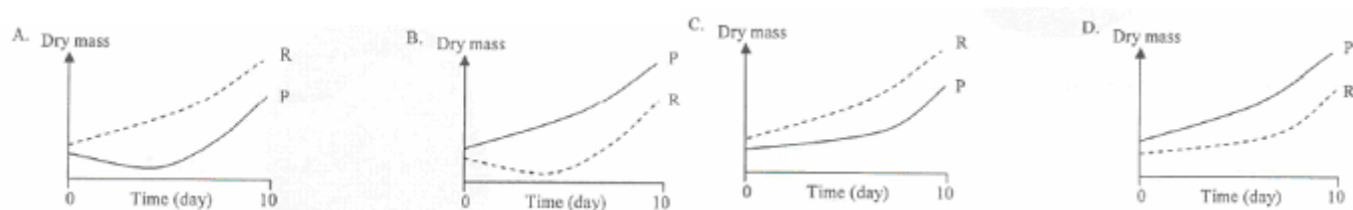
29. 2007/II/55

Which of the following correctly shows the change in the total dry mass of the germination seed in tube A?



30. 2008/II/53

Which of the following graphs correctly shows the change in the dry mass of the plumule (P) and the radicle (R) of a germinating seed?



1. 1992/II/50

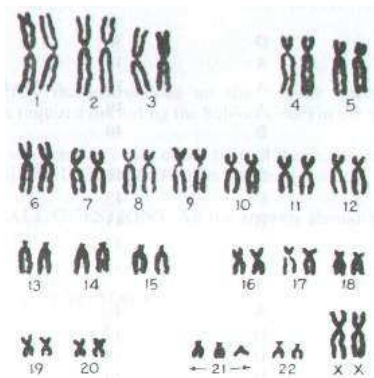
Which of the following body characteristics can be inherited?

- (1) skin colour (2) blood groups (3) night blindness

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

2. 1995/II/60

The diagram below shows the chromosomes of a dividing cell of a person suffering from a genetic disease :



What abnormality is the cell of this person ?

- A. There is one extra chromosome. B. There is no Y chromosome.
 C. The chromosomes exist as homologous pairs. D. The chromosomes are of different lengths and shapes.

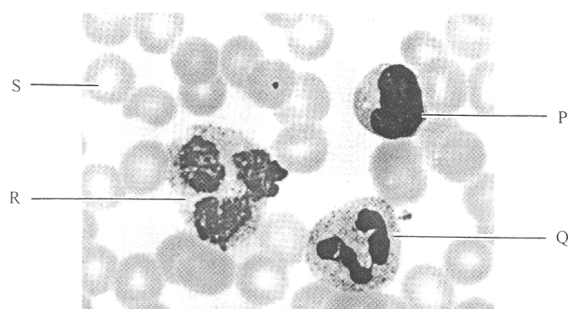
3. 1998/II/51

Which of the following human cells contains the greatest amount of DNA ?

- A. an egg B. a sperm C. a liver cell D. a red blood cell

4. 1999/II/26

Questions 4 and 5 refer to the photomicrograph below, which shows a human blood smear :



Which type of cells contains the least amount of DNA ?

- A. P B. Q C. R D. S

5. 1999/II/27

Which of the following descriptions of cell type Q is incorrect?

- A. It can engulf bacteria that enter the body. B. It can pass through the wall of the capillaries.
 C. It decreases in number if the body lacks iron. D. It increases in number during an infection of the body.

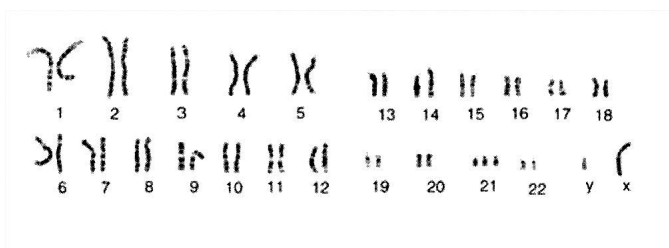
6. 2001/II/42

Which of the following descriptions of chromosomes in humans is correct ?

- A. Each body cell of a man has only one sex chromosome.
- B. Each chromosome duplicates before cell division occurs.
- C. During gamete formation, the chromosomes are randomly separated into two groups.
- D. The red blood cell and the white blood cell contain the same number of chromosomes.

7. 2002/II/9

Person Q has a genetic abnormality. The following photograph shows the chromosomes of one body cell of Q:



Which of the following statements are correct?

- (1) Person Q is a male.
 - (2) Person Q has 47 chromosomes in all his/her body cells.
 - (3) All the children of person Q will have this abnormality.
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

8. 2004/II/30

Which of the following is a correct statement about meiosis occurring in the human testis?

- A. DNA replicates before the start of meiosis I
- B. The pair of chromatids separates in meiosis I
- C. Homologous chromosomes pair up in meiosis II
- D. All daughter cells contain the Y chromosome

9. 2006/II/54

Peter has inherited the problem of G6PD deficiency from his parents. The allele for this character is located on the X chromosome. Which of the following family members of Peter is least likely to have this allele?

- A. Peter's father
- B. Peter's mother
- C. father of Peter's mother
- D. grandmother of Peter's mother

10. 2007/II/31

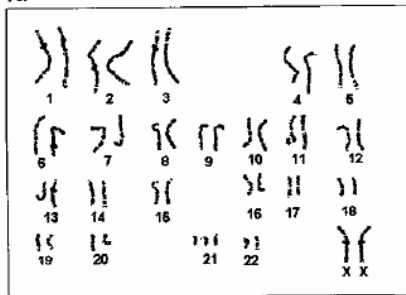
Which of the following statements about chromosomes are correct?

- (1) It is made up of DNA and proteins
 - (2) It plays a role in protein synthesis
 - (3) It is capable of replication
- A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1), (2) and (3)

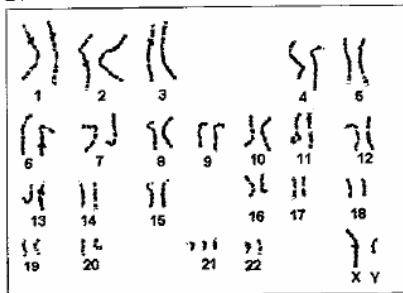
11. 2007/II/58

Which of the following photomicrographs shows the full set of chromosomes in a body cell of a boy with abnormalities in his chromosomes?

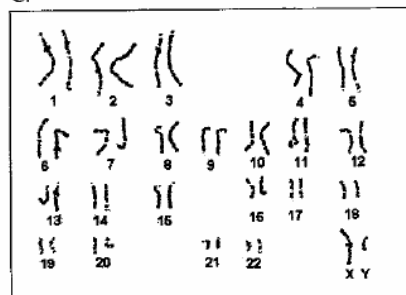
A.



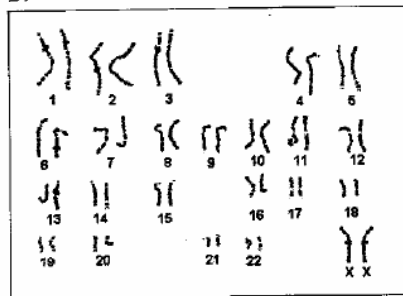
B.



C.



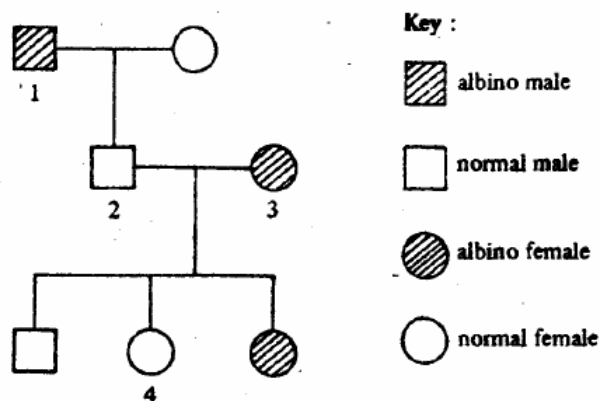
D.



1. 1990/II/53

In man, normal body pigmentation is determined by gene A whose recessive allele a brings about albinism (lacking of body pigments).

Question 1 and 2 refer to the pedigree shown below:



The genotype of individuals 1, 3 and 4 are:

- | | 1 | 3 | 4 |
|----|----|----|----|
| A. | aa | aa | Aa |
| B. | Aa | Aa | AA |
| C. | Aa | AA | AA |
| D. | AA | AA | aa |

2. 1990/II/54

If individuals 2 and 3 were to have another child, what is the chance of this child being an albino?

- A. 1/4 B. 1/2 C. 2/3 D. 3/4

3. 1991/II/30

In the fruit fly, red eye is dominant to white eye. A homozygous red-eyed fly is crossed with a heterozygous red-eyed fruit fly. The expected phenol ratio among the offspring is

- A. 1 red-eyed:1 white-eyed B. 1 red-eyed:3 white-eyed
 C. 3 red-eyed:1 white-eyed D. 1 red-eyed:0 white-eyed

4. 1992/II/51

Two grey rats are mated. The female gives birth to 2 young grey and 6 young black rats. Which of the following deductions is correct?

- A. Grey is dominant to black because black offspring appear
 B. Black is dominant to grey because in the young rats the ratio of the black to grey is 3 to 1
 C. Both grey and black are dominant because both kinds of young rats appear
 D. Both grey and black are recessive because both kinds of young rats appear

5. 1993/II/43

Which of the following produce offspring with identical genotypes?

- (1) budding in yeast
- (2) seed formation in pine
- (3) spore formation in bread mould

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

6. 1993/II/47

Questions 6 to 8 refer to the table below which shows the phenotypes and genotypes of two mice (X and Y).

A is the gene for black coat and A' is the gene for white coat.

	Mouse X	Mouse Y
Phenotype	Black coat	White coat
Genotype	AA	AA'

Which of the following statements is incorrect?

- A. A and A' are alleles
- B. A' is dominant to A
- C. A and A' are located on the same chromosome
- D. Mouse Y is heterozygous for coat colour

7. 1993/II/48

If A' resulted from a mutation of gene A, the mutation is most likely to have taken place in

- A. the ovary of mouse Y
- B. the ovary of the parent of mouse Y
- C. the skin of mouse Y
- D. the skin of the parent of mouse Y

8. 1993/II/49

In a population of mice, it is found that 80% of the mice are black-coated and 20% are white-coated. Which of the following shows the probable changes in the percentage of black mice and white mice in the following environment after one year?

Dark leafy area		White sandy area	
Black mice	White mice	Black mice	White mice
A. 90%	10%	70%	30%
B. 70%	30%	90%	10%
C. 90%	10%	90%	10%
D. 70%	30%	70%	30%

9. 1994/II/39

Brown eye colour is dominant to blue eye colour in man. A brown-eyed father and a blue-eyed mother have four children. Three of the children are blue-eyed and one is brown-eyed.

Which of the following statements is correct?

- A. The father is homozygous for eye colour.
- B. The phenotypic ratio of brown eyes to blue eyes in the children is 1 to 1.
- C. The chance of a fifth child being brown-eyed is $\frac{1}{2}$.
- D. The chance of a fifth child being blue-eyed is $\frac{3}{4}$.

10. 1995/II/51

In garden pea, the allele for tall stem (T) is dominant to the allele for short stem (t). A cross between a tall plant and a short plant gave rise to 92 tall plants and 106 short plants in F₁ generation.

What is the genotype of the tall parent plant?

- A. TT
- B. Tt
- C. tt
- D. TT and Tt

11. 1995/II/52

Referring to the cross described in question 51, the actual result based on Mendel's Law of Inheritance. This is because

- A. fertilization occurs at random.
- B. too many offspring are produced.
- C. the parent plants are not pure lines.
- D. the genotype of the tall parent is not known.

12. 1995/II/53

Which of the following cells from the same person have different genotypes among themselves?

- A. sperms
- B. neurones
- C. muscle cells
- D. white blood cells

13. 1996/II/54

Questions 13 and 14 refer to the table below which shows some features of a pair of twins:

	May	Amy
Body weight	50 kg	52 kg
Blood group	A	AB
Eye colour	Blue	Blue
IQ	100	115

Which of the following indicates whether they are identical twins or not?

- A. body weight
- B. blood group
- C. eye colour
- D. IQ

14. 1996/II/55

If both of their parents have brown eyes, which of the following can be deduced?

- (1) Brown eye colour is the dominant character.
- (2) Both parents are heterozygous for eye colour.
- (3) If May and Amy have another sister, she must also have blue eyes.

- A. (1) and (2) only
- B. (1) and (3) only
- C. (2) and (3) only
- D. (1), (2) and (3)

15. 1998/II/53

A woman give birth to a pair of twins P and Q. The diagram below shows their formation :

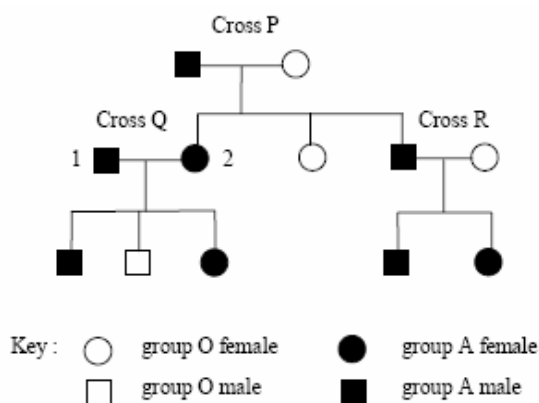


Which of the following characters of P and Q must be the same if they are brought up under the same environmental conditions ?

- (1) sex (2) height (3) blood group
 A. (1) only B. (2) only C. (1) and (3) only D. (2) and (3) only

16. 1999/II/50

Questions 16 and 17 refer to the pedigree below, which shows the inheritance of blood groups in a family :



Which cross(es) can be used to deduce which blood group (A or O) is dominant?

- A. cross Q only B. cross R only C. crosses Q and R only D. crosses P, Q and R

17. 1999/II/51

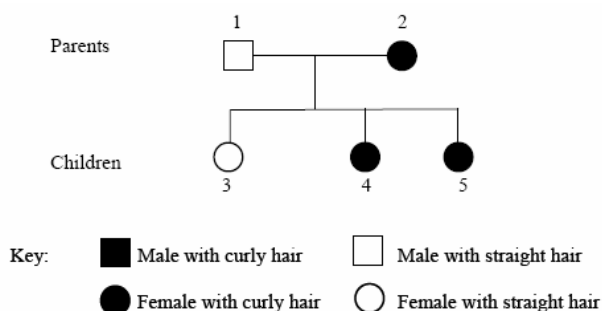
If A represents the allele for blood group A and O represents the allele for blood group O, what are the probable genotypes of individuals 1 and 2 ?

- | Individual 1 | Individual 2 |
|--------------|--------------|
| A. AO | AA |
| B. AO | AO |
| C. AA | AA, AO |
| D. AO, AA | AA |

18. 2000/II/40

Questions 18 to 20 refer to the following information :

The allele for curly hair in humans is dominant to the allele for straight hair. The pedigree below shows the inheritance of curly hair and straight hair in a family :



What is the chance of having another child who is a boy with straight hair?

- A. 0% B. 25% C. 50% D. 100%

19. 2000/II/41

If individuals 4 and 5 are twins, which of the following conclusions can be drawn?

- A. They were developed from the same zygote. B. They were developed from two different zygotes.
 C. They are genetically identical for all characters. D. No definite conclusions can be made.

20. 2000/II/42

Individual 3 is taller than individual 4. Which of the following may contribute to such a difference?

- (1) diet
 (2) meiosis
 (3) fertilization

- A. (1) only B. (1) and (2) only C. (2) and (3) only D. (1), (2) and (3)

21. 2001/II/39

The tail of a male rat and a female rat were cut off. What will be the phenotype of their offspring if they mate?

- A. All offspring will have tails. B. Half of the offspring will have tails.
 C. Only $\frac{1}{4}$ of the offspring will have tails. D. All offspring will not have tails.

22. 2001/II/55

The eye colour of Siamese cat is controlled by a pair of alleles. A cross between two brown-eyed cats produced four offspring, of which three had green eyes and one had brown eyes. Which of the following is correct?

- | Conclusion | Evidence |
|---------------------------|--|
| A. Brown eye is dominant. | The phenotypic ratio of the offspring is 3:1. |
| B. Brown eye is dominant. | Two brown-eyed parents produce green-eyed offspring. |
| C. Green eye is dominant. | The phenotypic ratio of the offspring is 3:1. |
| D. Green eye is dominant. | Two brown-eyed parents produce green-eyed offspring. |

23. 2003/II/18

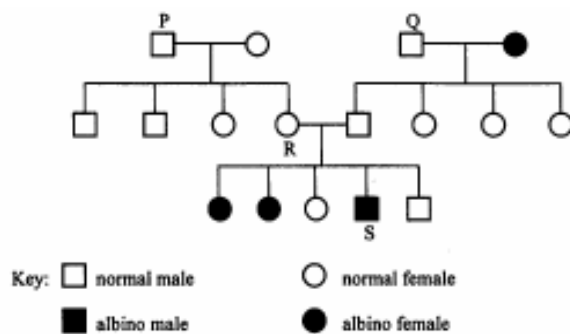
Which of the following are genetically identical?

- A. pollens of the same flower B. seeds in the same fruit
C. stem cutting from the same *Coleus* plant D. maize grains on the same cob

24. 2004/II/38

Questions 24 and 25 refer to the pedigree below, which shows the inheritance of albinism in a family.

Albinism is a condition characterized by the lack of a dark brown pigment in the body. The ability to produce this pigment is controlled by a pair of alleles



The information in the pedigree allows us to deduce the genotype of

- A. P and Q B. P and R C. Q and S D. R and S

25. 2004/II/39

What is the chance of R giving birth to another albino child?

- A. $1/4$ B. $1/2$ C. $3/5$ D. $3/4$

26. 2004/II/57

Joe and Jim are twin brothers. Which of the following characteristics of Joe and Jim allows you to determine whether they are identical twins or not?

	Joe	Jim
A. IQ	110	110
B. pulse rate	70	75
C. blood group	A	A
D. colour vision	normal	colour-blind

27. 2005/II/12

Mary, of blood group A, and her husband, of blood group O, have two children. Both children are found to have blood group A. Mary concludes that she must be homozygous for blood group A. Given that blood group A is dominant to blood group O, is Mary's conclusion correct?

- A. Yes, because each of Mary's children has inherited at least one allele for blood group A from her
- B. Yes, because if Mary is heterozygous, one child should be of blood group A and the other should be of group O
- C. No, because both children can be of blood group A even if Mary is heterozygous
- D. No, because there are other blood groups besides bloods group A and O

28. 2005/II/16

A gardener pollinated a purple-flowered pea plant with the pollens from a white-flowered pea plant. When the seeds obtained from this cross were germinated, he obtained 252 purple-flowered plants and 245 white-flowered plants. What conclusion can be drawn from the result of this cross?

- A. Purple flower colour is dominant to white flower colour
- B. Neither purple nor white flower colour is dominant
- C. Both parent plants are heterozygous
- D. One parent plant is homozygous and the other is heterozygous

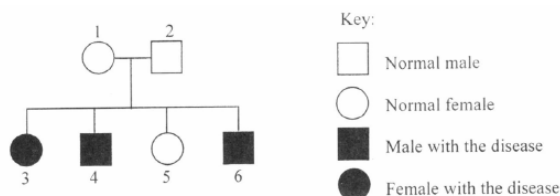
29. 2006/II/13

Two homozygous parents with different phenotypes of the same trait are crossed to produce some offspring. Which of the following correctly describes the offspring with respect to this trait?

- A. The offspring may have two different phenotypes
- B. The offspring are similar to both parents
- C. The offspring only show one phenotype
- D. The offspring are homozygous

30. 2006/II/14

Questions 30 and 31 refer to the pedigree below, which shows the inheritance of hereditary disease in a family. Whether a person has this disease is controlled by a pair of alleles



The allele for this disease is

- A. dominant because the ratio of offspring with the disease to normal offspring is 3 to 1
- B. dominant because individual 5 has the same phenotype as that of both parents
- C. recessive because both parents are normal but some offspring have the disease
- D. recessive because both parents have the same phenotype

31. 2006/II/15

If individual 5 married a man with the disease, what is the probability that their first child would be a man with the disease? (Hint: There are two possible genotypes for the dominant character)

- A. 0 or 1/4 B. 0 or 1 C. 1/4 or 1/2 D. 1/2 or 1

32. 2007/II/51

P, Q and R are triplets. The phenotypes of serial traits found in them are listed below:

	Sex	Blood group	Eye colour	Weight (kg)
P	Male	O	Blue	52
Q	Male	O	Brown	52
R	Female	O	Brown	45

Which of the following conclusions is correct?

- A. P, Q and R are non-identical triplets B. P and Q are identical twins but R is not
C. P and R are identical twins but Q is not D. Q and R are identical twins but P is not

33. 2008/II/28

Questions 33 and 34 refer to the following table which shows some characters of a pair of twins:

	Alan	Ben
Blood group	A	AB
Ear lobe	Present	Present
Height	180 cm	175 cm

Which of the following conclusions can you draw from the above information?

- A. They are identical twins because they both have ear lobes
B. They are non-identical because they have different blood group
C. They are non-identical twins because they have different height
D. There is insufficient information to determinate whether they are identical twins or not

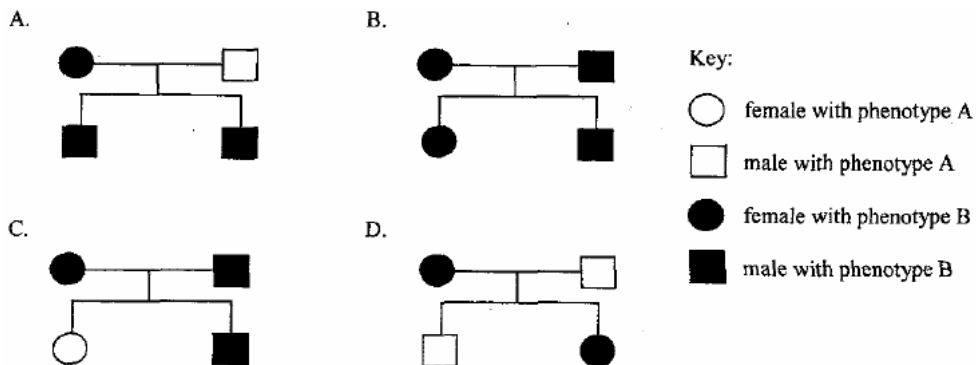
34. 2008/II/29

Which of the following can be deduced from the information given?

- A. Lobed ear is the dominant trait
B. Both parents are homozygous for lobed ear
C. Both parents are heterozygous for lobed ear
D. At least one of the parents possess an allele for lobed ear.

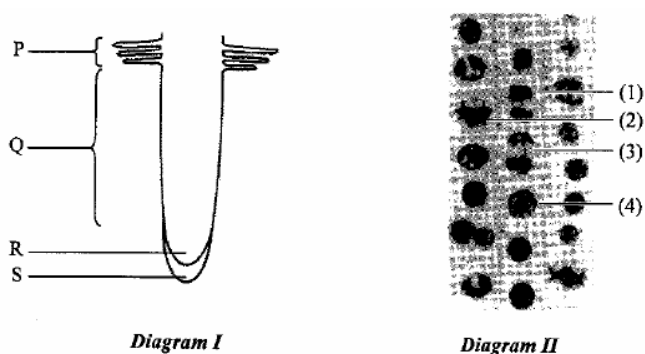
35. 2008/II/30

The following pedigrees below show the inheritance of a character in four different families. The character is controlled by a pair of alleles. Which pedigree allows you to deduce the dominant phenotype?



36. 2008/II/51

Questions 36 and 37 refer to the diagrams below. Diagram I shows the longitudinal section of a part of root. Diagram II shows photomicrograph of the cells taken from the root.

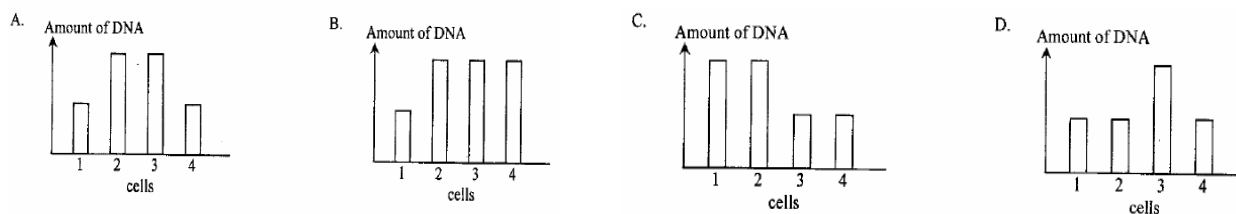


The cells shown in Diagram II are probably taken from region

- A. P B. Q C. R D. S

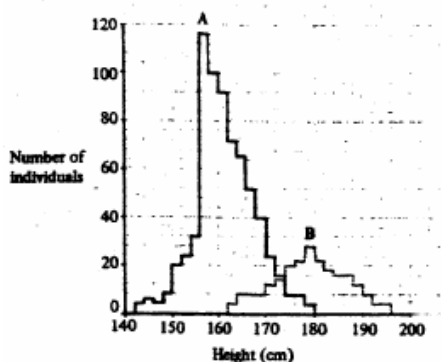
37. 2008/II/52

Which of the following bar charts shows the relative amount of DNA present in the labelled cells shown in Diagram II?



1. 1990/II/56

The following histogram shows the distribution of heights of two random samples of males from two human populations A and B:



Which of the following statement(s) is/are correct?

- (1) The most common height in population A is 156-158 cm
- (2) The average height of population A is greater than that of population B
- (3) All the individuals in population A are shorter than those of population B

A. (1) only B. (3) only C. (1) and (2) only D. (2) and (3) only

2. 1993/II/50

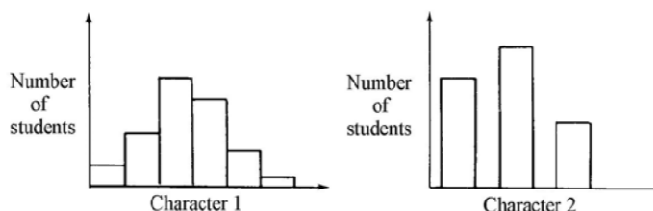
Alice and Betty are twins who developed from two different fertilized eggs and were brought up in different countries. The twins are now 20 and Alice is taller and heavier than Betty. The difference between the two sisters may be due to the fact that:

- (1) they were brought up on different diets
- (2) they received different genes from their parents
- (3) they had different types of physical training during their development

A. (1) and (2) only B. (1) and (3) only C. (2) and (3) only D. (1),(2) and (3)

3. 1997/II/48

Two characters of a class of students were measured and the results are shown in the graphs below:



The two characters are probably

Character 1

- A. rate of heart beat
- B. height
- C. intelligence
- D. blood groups

Character 2

- A. skin colour
- B. ability to roll the tongue
- C. blood groups
- D. rate of heart beat

4. 1998/II/52

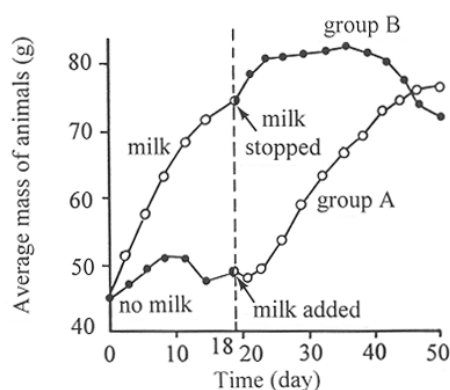
The existence of variations within a population enables

- A. an increase in the mutation rate.
- B. an increase in the population.
- C. the offspring to grow faster.
- D. the survival of the fittest.

5. 2000/II/59

Questions 5 and 6 refer to the following information :

In the early 1900s, Frederick Hopkins performed an experiment using rats. He divided young rats from the same litter (developed from a single pregnancy) into two groups. Group A was fed with purified protein, sugar, starch, fat, mineral salts and water. Group B received the same food plus 3 mL of milk each day. After 18 days, group A instead of group B was given the milk. The results of the experiment are shown in the graph below :



Based on the given information, what do you think was the aim of Hopkins's experiment ?

- A. To show that the growth of rats requires protein, carbohydrates, fat, mineral salts, water and vitamins.
- B. To show that milk is more important than protein, carbohydrates, fat, mineral salts and water for the growth of rats.
- C. To show that milk contains vitamin A which is necessary for the normal growth of rats.
- D. To show that milk contains some substances that are essential for the growth of rats.

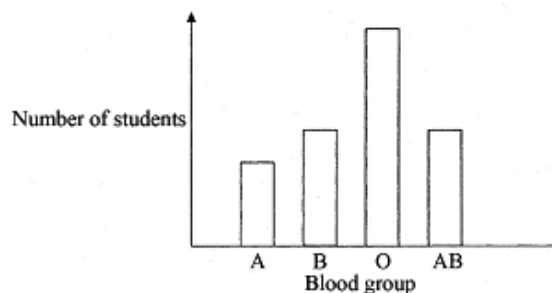
6. 2000/II/60

In this experiment, Hopkins used rats from the same litter. This was to ensure that at the beginning of the experiment the two groups of rats

- A. showed the least variation.
- B. were of the same genotype.
- C. were of the same phenotype.
- D. did not contain vitamin A.

7. 2002/II/51

The following bar chart shows the distribution of different blood groups in a class of students :



Which of the following can be concluded from the bar chart?

- A. Blood group shows continuous variation.
- B. Blood group O is the dominant phenotype.
- C. Blood group A is the least common among these students.
- D. Blood group in humans is controlled by four alleles.

8. 2003/II/55

The table below lists some information about two brothers:

	Tom	Andy
Blood group	A	O
Eye colour	Brown	brown
Tongue rolling ability	Tongue roller	Tongue roller

Note: Blood group A, brown eye colour and tongue rolling are dominant characters.

What can be implied from the above information?

- A. Tom can receive blood transfused from Andy (*Out of Syll.*)
- B. They are homozygous for brown eyes
- C. Both their parents are tongue rollers
- D. Their sex chromosomes have the same genetic make-up

9. 2006/II/16

Which of the following characteristics is an example of continuous variation?

- A. blood group
- B. iris colour
- C. shape of the ear lobe
- D. heartbeat rate

10. 2006/II/58

If a mutation leads to the development of a character which is dominant, which of the following can be deduced from this?

- A. There will be more individuals in the population carrying its allele than if the mutation leads to recessive character
- B. There will be more individuals possessing this character in the population
- C. All individuals in the population this allele will possess this character
- D. It will cause the death of the individuals carrying this allele

11. 2008/II/31

Which of the following types of organisms is most likely to face extinction in a natural environment?

- A. organisms with short life span and early maturity
- B. organisms with short life span and late maturity
- C. organisms with long life span and early maturity
- D. organisms with long life span and late maturity

12. 2008/II/44

Which of the following processes does not contribute to variations in humans?

- A. mutation
- B. random fertilization
- C. formation of gametes
- D. duplication of chromosomes

1. 2005/II/60

Which of the followings NOT an advantage of growing genetically modified crop plants in agriculture?

- A. The crop plants are more resistant to pests
- B. Overcrowding of the crop plants can be prevented
- C. The production of the crop plants can be increased
- D. The nutrients value of the plant products is higher

2. 2007/II/35

A genetically modified rice is being developed so as to increase its harvest. This can be achieved by the insertion of a gene that can produce

- A. vitamin A
- B. a human protein
- C. a toxin to kill pests
- D. a substance to lengthen the shelf life

3. 2008/II/45

Arrange the following steps of genetic engineering in the correct order.

- (1) multiply copies of the gene by the host cell
 - (2) insert the desired gene into the vector
 - (3) cut out the desired gene
 - (4) introduce the vector into the host cell
 - (5) screen for host cells with the desired gene
- A. (3),(2),(4),(5),(1)
 - B. (3),(2),(5),(4),(1)
 - C. (5),(3),(2),(4),(1)
 - D. (5),(3),(4),(2),(1)

1. 2005/II/52

Fossil records are valuable in the study of evolution because they provide information about

- A. the population
- B. the cause of mutation in organisms
- C. the time of existence of organisms
- D. the life span of different species

2. 2006/II/56

In the nineteenth century, most of the peppered moths in England were white. About 100 years later, 98% of the moths recorded in industrial areas were black while most in rural areas were still white.

This is an example of

- A. competition.
- B. evolution.
- C. natural selection.
- D. variation.

3. 2008/II/42

Natural selection acts upon

- A. an organism's genotypes
- B. an organism's phenotypes
- C. an organism through its habitat
- D. an organism through its offspring

1. 1992/II/35

Two samples of human blood were mixed. Observation under the microscope showed no clumping of blood cells. Which of the following is the best conclusion?

- A. The samples were of blood group O.
- B. The samples were of blood group AB.
- C. The samples were of the same blood group.
- D. The samples were of different blood group.

2. 1993/II/28

Dianna belongs to blood *group A* and her brother John belongs to blood *group B*. Their father can receive a blood donation from John only and their mother can donate blood to Dianna only. To which blood groups do their parents belong?

- | | Father | Mother |
|----|---------------|---------------|
| A. | B | A |
| B. | A | O |
| C. | AB | B |
| D. | O | AB |

3. 1994/II/13

Cindy can only receive blood of group B and group O in a blood transfusion. Her blood group is

- A. A. B. B. C. AB. D. O.

4. 1996/II/30

The table below summarizes the compatibility for blood transfusion among three persons:

		Recipient		
		Mary	John	David
Donor	Mary		✗	✓
	John	✗		✓
	David	✗	✗	

Key: ✓ = blood can be transfused with no ill effects

✗ = blood should not be transfused

If the blood group of Mary is A, what are the blood groups of the others?

- | | <u>John</u> | <u>David</u> |
|----|--------------------|---------------------|
| A. | O | A |
| B. | O | AB |
| C. | B | A |
| D. | B | AB |

5. 1997/II/22

Which of the following statements about blood transfusion is correct?

- A. The antigens of the donor and the recipient must be the same.
- B. The antibodies of the donor and the recipient must be the same.
- C. The antigens of the donor must not react with the antibodies of the recipient.
- D. The antibodies of the donor must match the antigens of the recipient.

6. 2002/II/41

The table below shows the compatibility for blood transfusion of two persons :

		Blood group of donor	
		A	B
Recipient	Peter	✗	✗
	Mary	✓	✓

Key: ✓ = blood can be transfused with no ill effects

✗ = blood should not be transfused

Which of the following combinations correctly shows the compatibility for blood transfusion between Peter and Mary ?

Peter donating blood to Mary**Mary donating blood to Peter**

- | | | |
|----|---|---|
| A. | ✓ | ✓ |
| B. | ✗ | ✗ |
| C. | ✓ | ✗ |
| D. | ✗ | ✓ |

1. 1992/II/22

Which of the following food preservation methods is *least* effective in killing microorganism?

- A. immersing fruit into syrup
- B. keeping meat in a refrigerator
- C. boiling beef in a pressure cooker
- D. adding sulphur dioxide to fruit juice

2. 1995/II/58

Which of the following treatments would *not* kill the microorganisms present in the food?

- A. boiling
- B. canning
- C. pasteurization
- D. refrigeration

3. 1996/II/33

Which of the following is a correct match between the method of food preservation and the principle involved?

Method	Principle
A. Canning	Microorganisms are inactivated due to the lack of oxygen.
B. Drying	Microorganisms are killed by removing water.
C. Freezing	Microorganisms are inactivated by low temperatures.
D. Pasteurization	Microorganisms are killed by prolonged heating at above 100°C.

4. 1997/II/57

The electricity supply to a refrigerator was accidentally cut off for 24 hours. Which of the following items stored in the refrigerator, if consumed, may lead to food poisoning?

- A. fresh apple
- B. honey
- C. ice cream
- D. soft drink

5. 2003/II/43

Which of the following foods will turn bad first when stored at room temperature?

- A. salted fish
- B. instant noodles
- C. pasteurized milk
- D. vegetables in vinegar

6. 2004/II/40

Which of the following food preservation methods has the least effect on the flavour of the food?

- A. heating
- B. salting
- C. dehydrating
- D. refrigeration